

# **EIGHT-HOUR OZONE PLAN FOR THE MARICOPA NONATTAINMENT AREA**

**JUNE 2007**



**EIGHT-HOUR OZONE PLAN  
FOR THE MARICOPA NONATTAINMENT AREA**

Prepared by:  
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Technical Assistance Provided by:  
Arizona Department of Environmental Quality  
Arizona Department of Transportation  
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U.S. Environmental Protection Agency

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## **EIGHT-HOUR OZONE PLAN FOR THE MARICOPA NONATTAINMENT AREA**

### **EXECUTIVE SUMMARY**

On June 15, 2004, EPA designated a 4,880 square mile area located mainly in Maricopa and Pinal Counties as an eight-hour ozone nonattainment area. The Clean Air Act requires that a plan be submitted to EPA by June 15, 2007 that shows attainment of the eight-hour ozone standard in the Maricopa nonattainment area. The plan must demonstrate that the eight-hour ozone standard will be met by the ozone season of 2008, with measures that have been implemented before the ozone season of 2008.

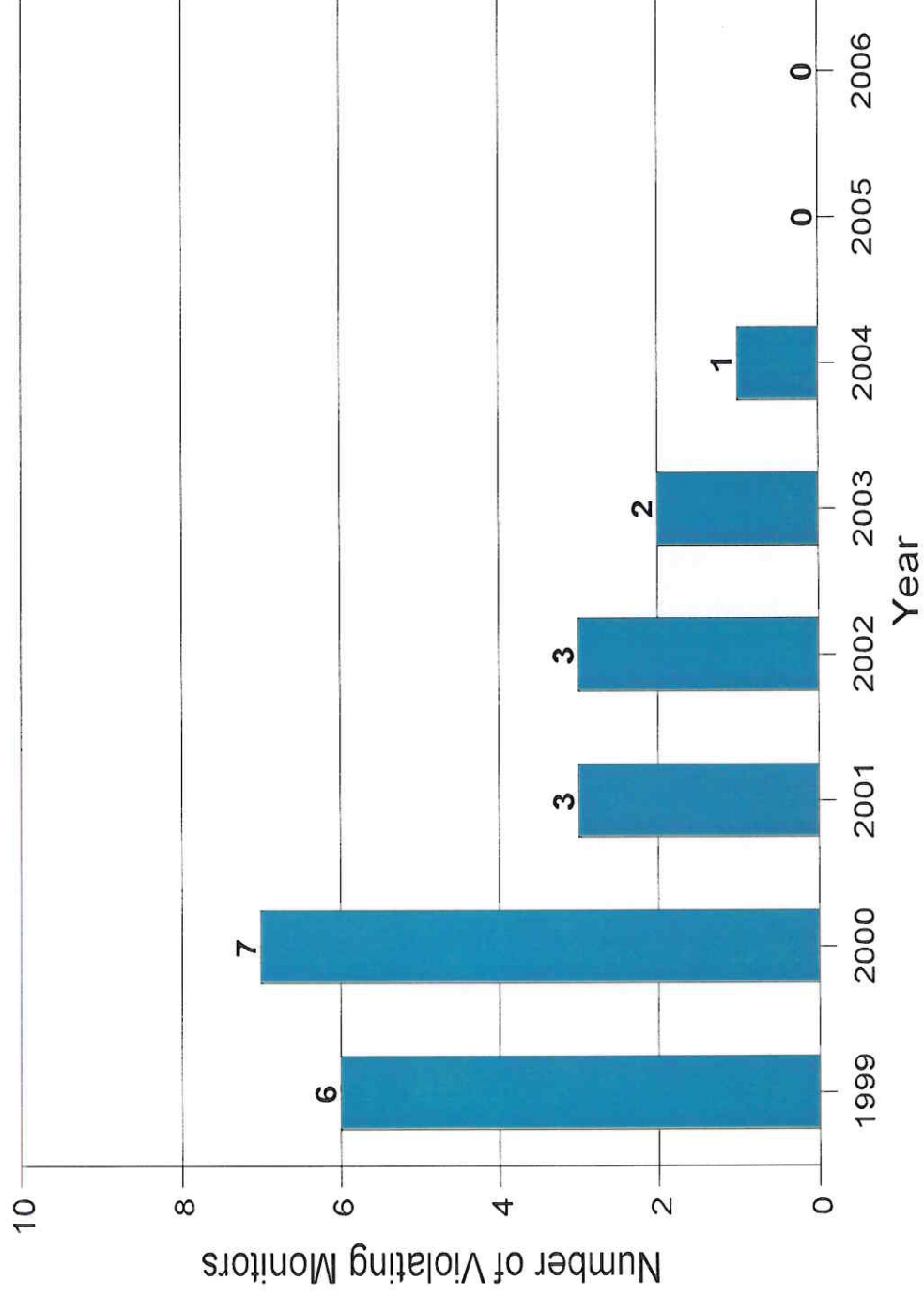
The plan uses photochemical modeling to show that the standard will be attained in 2008 with federal, state, and local control measures that have already been implemented in the region. The modeling results are supported by a downward trend in monitored ozone concentrations. As Figure ES-1 indicates, the eight-hour ozone standard has not been violated at any monitor in the Maricopa nonattainment area for the past two years (i.e., 2005 and 2006).

Ozone is formed by chemical reactions among volatile organic compounds (VOC), nitrogen oxides (NO<sub>x</sub>), and other air pollutants, in the presence of heat and sunlight. The ozone precursor emissions on the highest ozone day during the June 2002 episode are summarized in Figure ES-2. The major source of VOC is natural vegetation (i.e., biogenics). Onroad mobile and area sources each contribute another 13 percent of the total VOC emissions. Motor vehicles are the largest source of nitrogen oxide (NO<sub>x</sub>), contributing nearly two-thirds of the emissions. Nonroad engine exhaust is responsible for another 27 percent. Together, onroad and nonroad mobile sources produce 90 percent of the total NO<sub>x</sub> emissions.

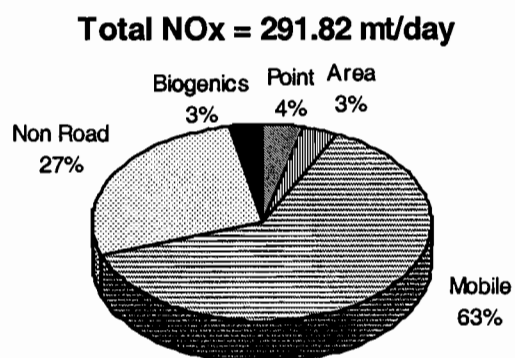
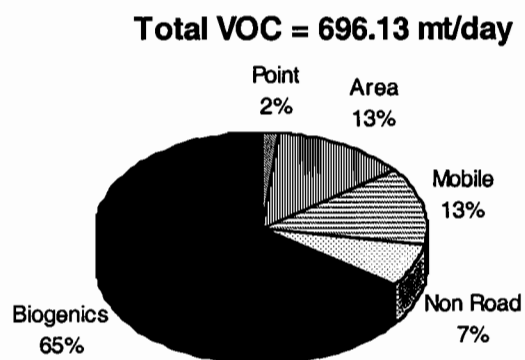
To demonstrate attainment by the ozone season of 2008, the plan assumes emission reduction credit for seven attainment measures. Figures ES-3 and ES-4 show the VOC and NO<sub>x</sub> reductions, respectively, for the individual attainment measures in June 2008. All of the attainment measures represent legally binding commitments in EPA-approved air quality plans that have already been implemented in the Maricopa area. Figure ES-5 shows the VOC and NO<sub>x</sub> emissions in June 2008 with the attainment measures.



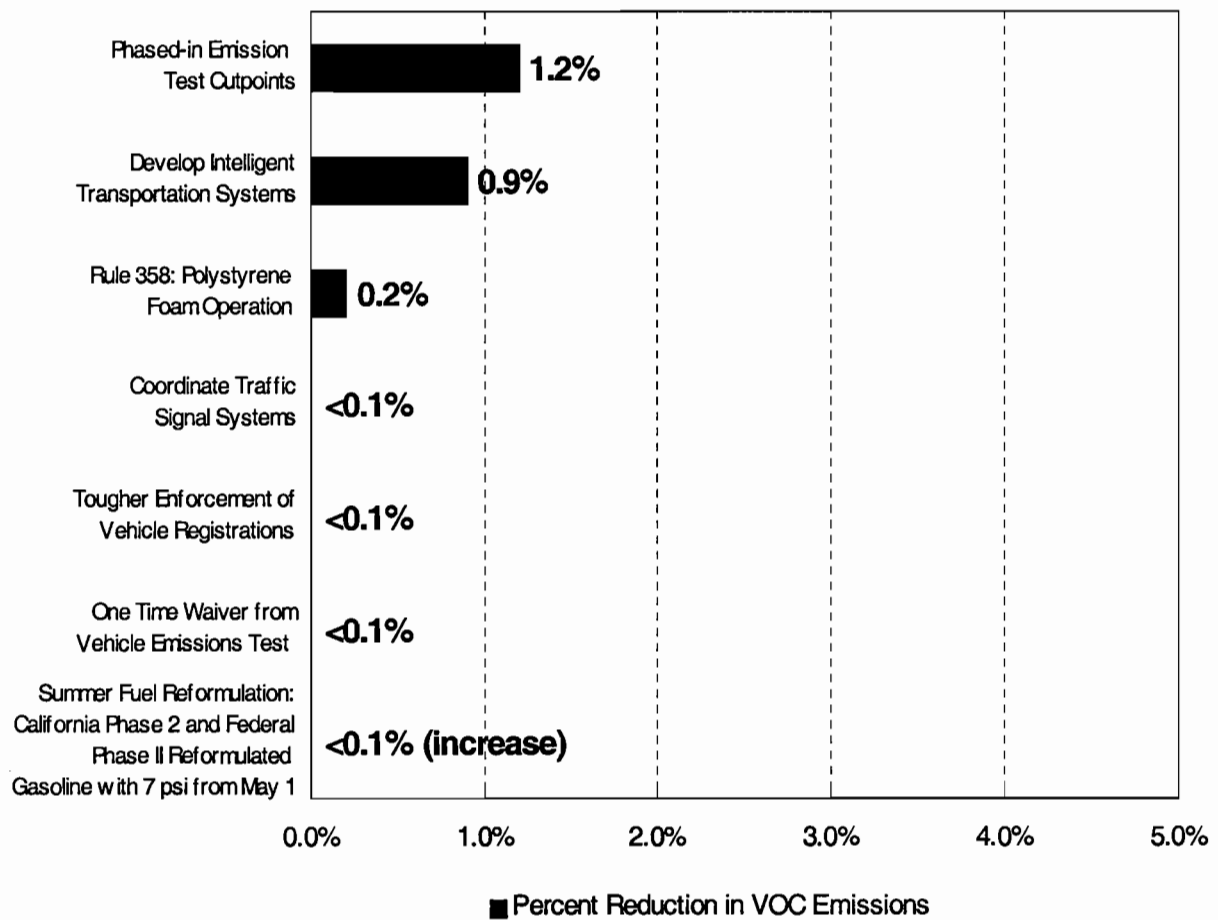
**FIGURE ES-1**  
**VIOLATIONS OF THE EIGHT-HOUR OZONE STANDARD IN THE**  
**MARICOPA COUNTY NONATTAINMENT AREA**



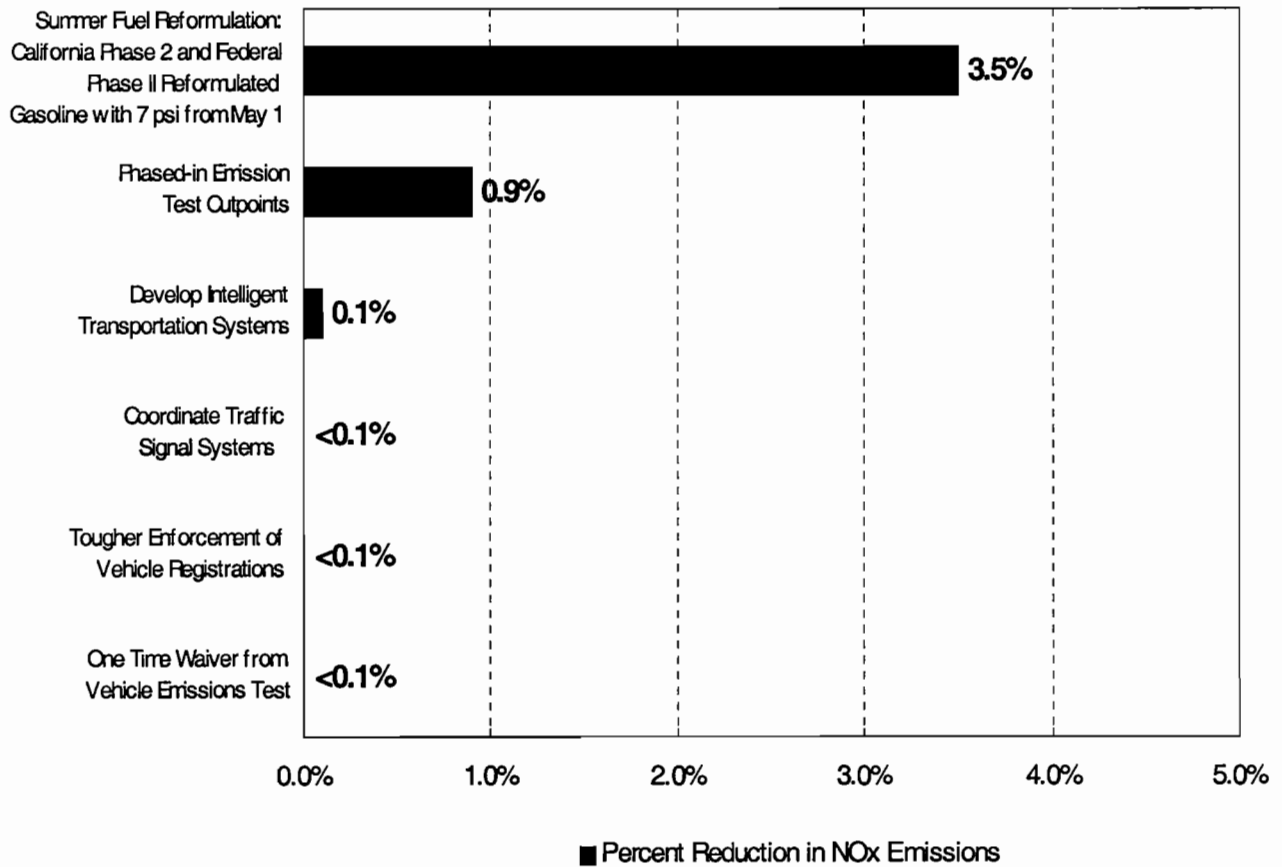
**FIGURE ES-2**  
**VOC AND NO<sub>x</sub> EMISSIONS ON JUNE 6, 2002**



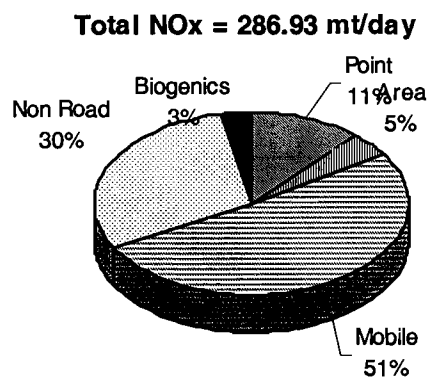
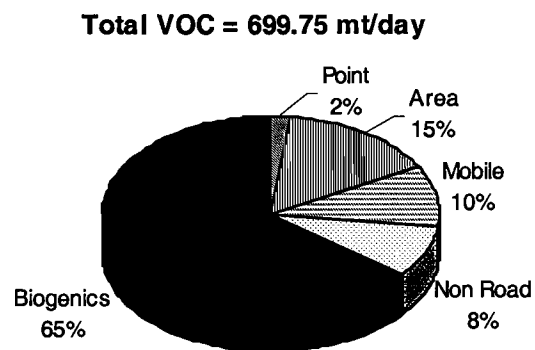
**FIGURE ES-3**  
**VOC REDUCTIONS BY INDIVIDUAL ATTAINMENT MEASURE IN JUNE 2008**



**FIGURE ES-4**  
**NO<sub>x</sub> REDUCTIONS BY INDIVIDUAL ATTAINMENT MEASURE IN JUNE 2008**



**FIGURE ES-5**  
**VOC AND NO<sub>x</sub> EMISSIONS WITH ATTAINMENT MEASURES IN JUNE 2008**



As required by the Clean Air Act, the attainment plan also includes contingency measures. Figures ES-6 and ES-7 show the VOC and NO<sub>x</sub> emission reductions, respectively, attributable to the individual contingency measures. Credit for the contingency measures was not assumed in modeling attainment in 2008. The contingency measures have all been implemented, as allowed by EPA, in order to ensure that the standard is met as expeditiously as possible. Early implementation of the contingency measures serves to reinforce the emission reductions credited to the attainment measures. EPA also allows federal measures to be contingency measures if the credit for these measures is not needed for attainment.

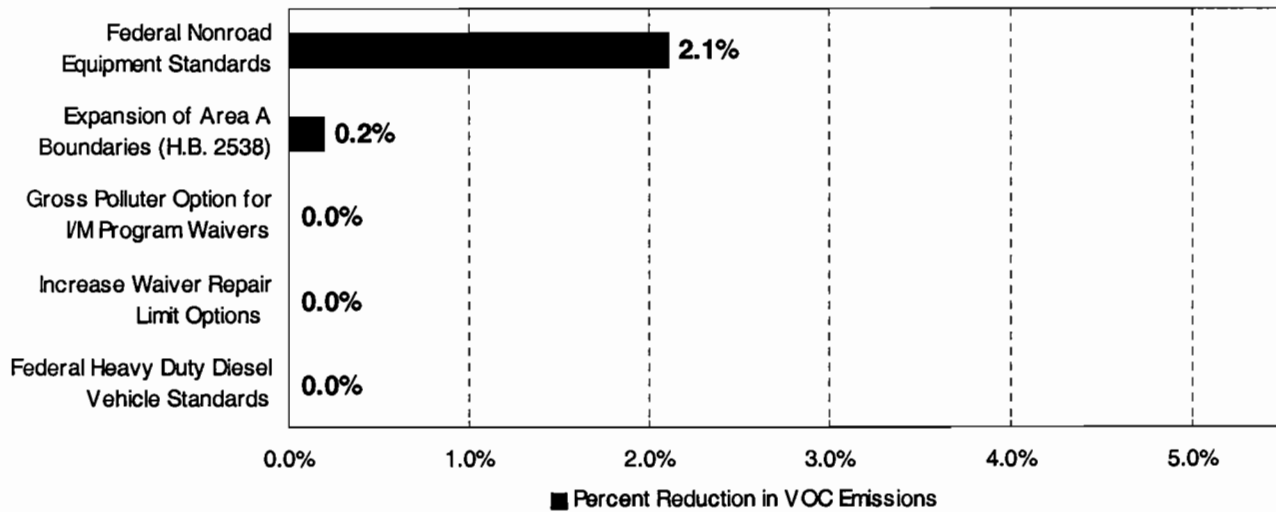
The photochemical grid modeling was conducted for multi-day high ozone episodes that occurred in June 2002, July 2002, and August 2001. These three episodes were selected because they represent a range of meteorological conditions and diurnal and spatial emission patterns that can lead to high ozone concentrations in the nonattainment area [MAG, 2005]. Attainment was modeled by applying the base year meteorology and diurnal and spatial pattern of emissions on the episode days to projected 2008 emissions. The attainment demonstration assumed emission reduction credit for the seven attainment measures, which have all been implemented. Figure ES-8 is a contour plot of the modeled eight-hour ozone concentrations for the June 2008 episode.

All of the predicted values in the contour plot are 84 ppb (0.084 ppm) or less. The predicted ozone values for the July and August 2008 episodes are also 84 ppb (0.084 ppm) or less. Therefore, the modeling indicates that the eight-hour ozone standard is attained for all three episodes in 2008.

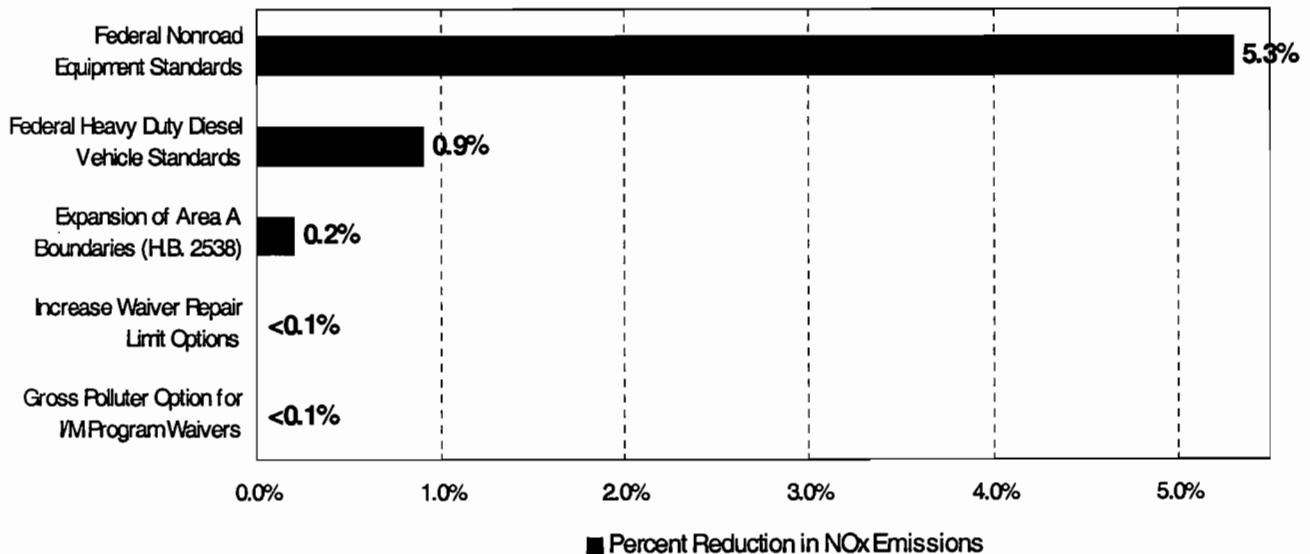
Since the peak modeled ozone values were so close to the standard, a screening test and weight of evidence analysis were performed to supplement the modeling results. The screening test indicated that areas not near monitors would also attain the standard for all three episodes. The weight of evidence analysis also concluded that the eight-hour ozone standard will be met during the ozone season of 2008, based on downward trends in concentrations of ozone precursors and ozone concentrations.

The attainment plan establishes onroad mobile source emissions budgets for transportation conformity. The 2008 conformity budgets for the eight-hour ozone nonattainment area are 67.9 metric tons per day for VOC and 138.2 metric tons per day for NO<sub>x</sub>. After these budgets are found to be adequate or approved by EPA as part of the attainment plan, they will replace the interim eight-hour ozone emissions tests currently being used in conformity analyses.

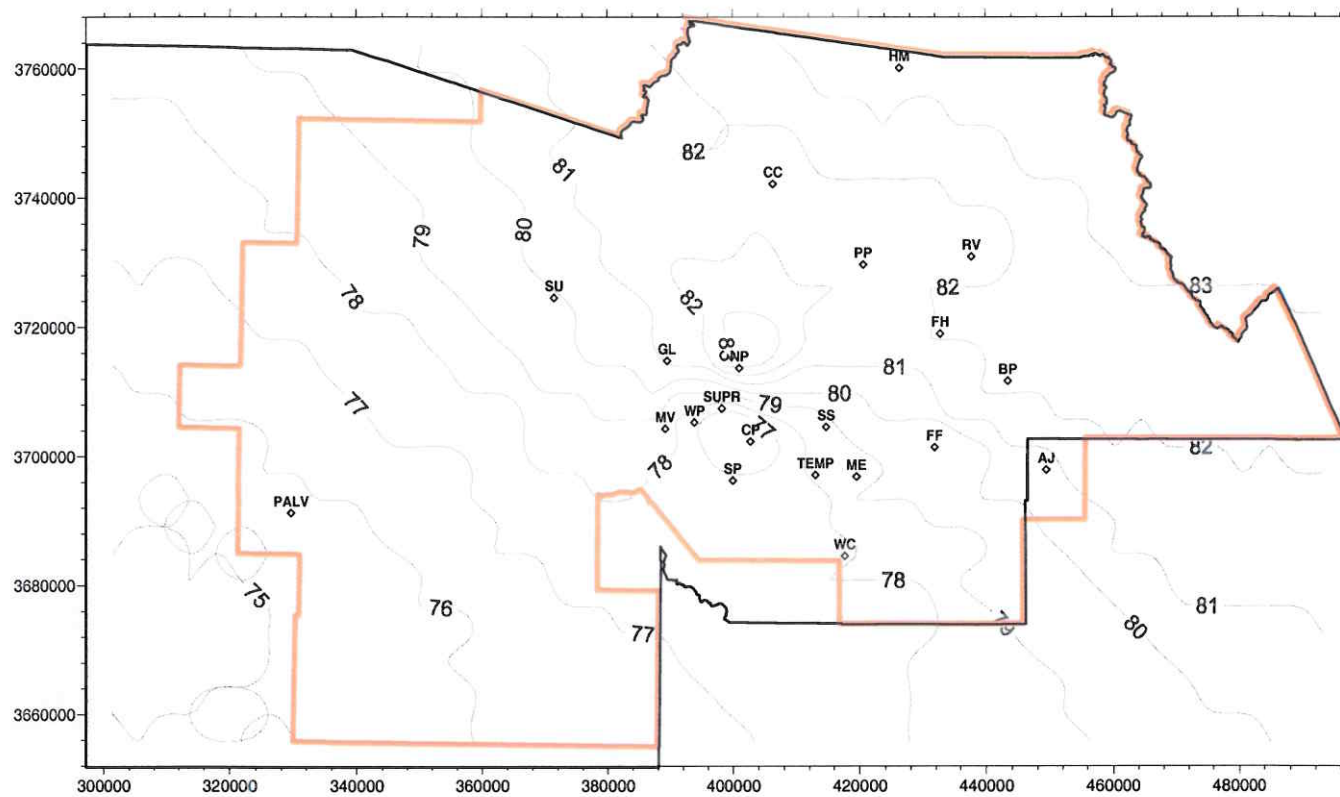
**FIGURE ES-6  
VOC REDUCTIONS BY INDIVIDUAL CONTINGENCY MEASURE**



**FIGURE ES-7  
NO<sub>x</sub> REDUCTIONS BY INDIVIDUAL CONTINGENCY MEASURE**



**FIGURE ES-8**  
**PREDICTED EIGHT-HOUR OZONE CONCENTRATIONS IN JUNE 2008 (IN PPB)**





## **CHAPTER ONE**

### **INTRODUCTION**

According to the Clean Air Act, the Maricopa eight-hour ozone nonattainment area must submit a plan to the U.S. Environmental Protection Agency (EPA) by June 15, 2007 that demonstrates attainment of the eight-hour ozone standard by June 15, 2009. The photochemical grid modeling, supporting technical analyses, and documentation for the attainment demonstration have been prepared by the Maricopa Association of Governments (MAG), with technical assistance from the Arizona Department of Environmental Quality (ADEQ), Arizona Department of Transportation (ADOT), Maricopa County Air Quality Department (MCAQD), and EPA.

In 1978, the Governor of Arizona designated MAG as the lead air quality planning agency for Maricopa County. Together with the State, MAG is responsible for determining which elements of the State Implementation Plan (SIP) will be planned, implemented, and enforced by the State, Maricopa County, and local governments in Arizona. In 1992, the Arizona Legislature recertified MAG as the regional air quality planning agency. MAG coordinates with ADEQ, ADOT, and MCAQD in developing the plans necessary to attain and maintain the national standards.

This Eight-Hour Ozone Plan will be reviewed and approved by the MAG Air Quality Technical Advisory Committee, the MAG Management Committee, and the MAG Regional Council before it is submitted to ADEQ and EPA as a SIP revision. The MAG Air Quality Technical Advisory Committee was established in 1995 with representatives from State, county and local governments, private industry, environmental groups, and the public-at-large. The Air Quality Technical Advisory Committee makes recommendations to the MAG Management Committee on air quality plans, projects, funding and other pertinent issues.

The MAG Management Committee is comprised of managers from each of the MAG member agencies that include twenty-five cities and towns, the Fort McDowell, Salt River Pima-Maricopa, and Gila River Indian Communities, Maricopa County, and the Arizona Department of Transportation. The MAG Management Committee makes recommendations to the MAG Regional Council. The Regional Council is the MAG decision-making body and is composed of elected officials from the MAG member agencies.

MAG and ADEQ will also conduct public hearings on this plan in accordance with federal requirements. The public hearings will be held at the MAG Offices, 302 N. 1<sup>st</sup> Avenue, in the Saguaro Room, on June 1, 2007 at 5:30 p.m. and June 4, 2007 at 5:30 p.m. All public comments and responses will be compiled in Appendix B, Exhibit 1.

## NATIONAL AMBIENT AIR QUALITY STANDARD FOR OZONE

On July 18, 1997, EPA promulgated a new eight-hour ozone standard that was more stringent than the one-hour ozone standard. EPA subsequently revoked the one-hour ozone standard, effective June 15, 2005. Compliance with the eight-hour standard of 0.08 ppm is determined by averaging the annual fourth highest eight-hour ozone concentration over three years. EPA requires that the monitored eight-hour ozone values be rounded to the nearest 0.01 ppm, which means that a violation occurs when the three year average of the fourth highest monitored concentration is 0.085 ppm or greater. There have been no violations of the eight-hour ozone standard at any monitor in the Maricopa nonattainment area since 2004.

## CHARACTERISTICS AND HEALTH EFFECTS OF OZONE

Ozone is not directly emitted by a source, but is produced by chemical reactions among volatile organic compounds (VOC), nitrogen oxides (NO<sub>x</sub>), and other air pollutants, in the presence of heat and sunlight. VOC and NO<sub>x</sub> are emitted by onroad vehicles and nonroad engines. Other sources of these ozone precursor emissions include industrial, manufacturing, and electrical power generation facilities; dry cleaners, service stations, architectural coatings, consumer and commercial solvent use; and natural vegetation. Peak concentrations of ozone typically occur in the urban area from May through September when high temperatures are conducive to the formation of ozone. Also, due to prevailing afternoon winds, ozone precursors and ozone are transported to the mountainous areas east and north of the Maricopa nonattainment area where elevated levels of ozone may occur.

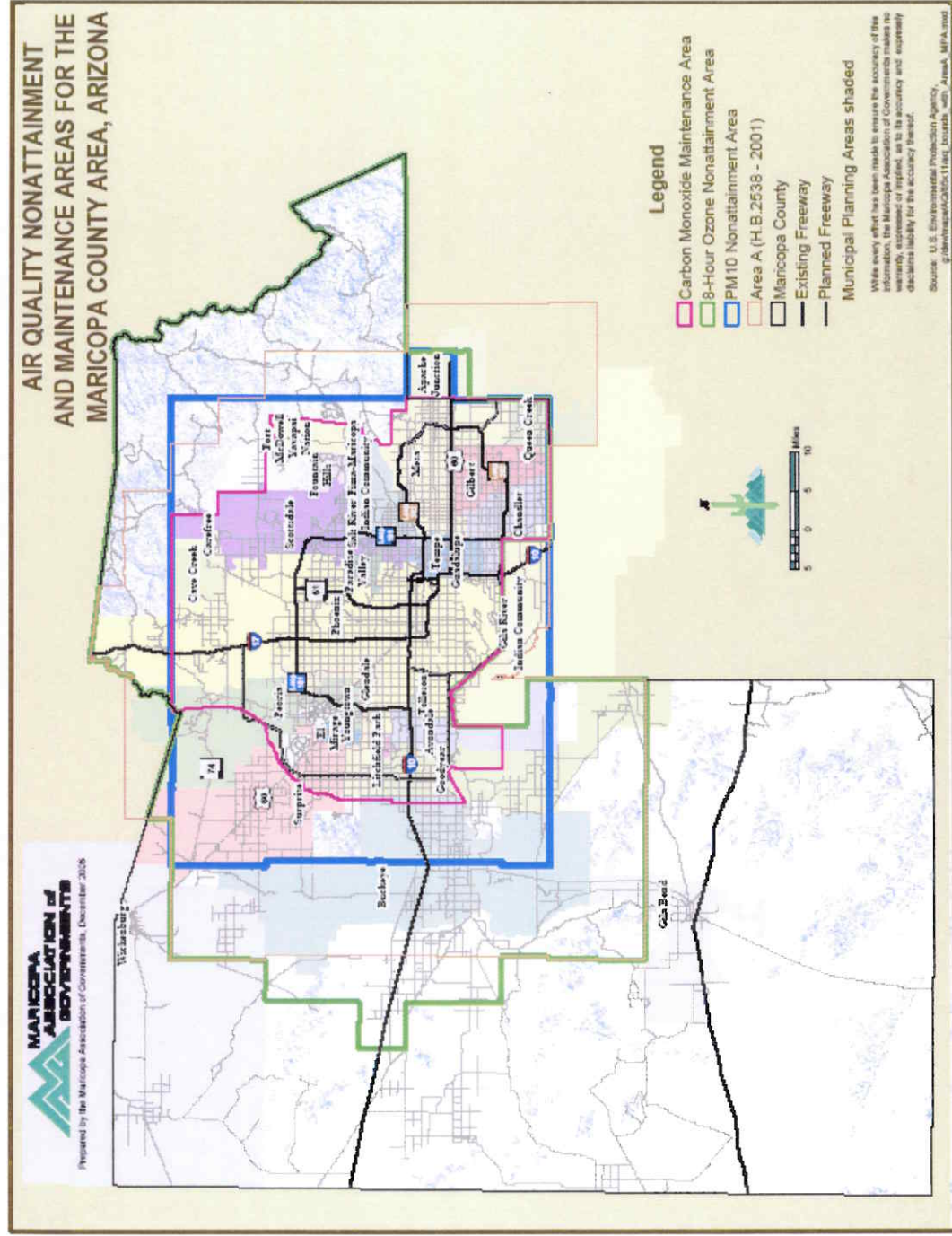
Ozone irritates the lungs and repeated exposure may cause permanent lung damage. Symptoms of ozone exposure may include wheezing, coughing, and pain when taking a deep breath. Children, persons with pre-existing respiratory conditions such as asthma, and others who are active outdoors when ozone levels are high are most affected by the adverse health effects of ozone. Even low levels of ozone may cause aggravated asthma, reduced lung capacity, and make persons more susceptible to respiratory illnesses like pneumonia and bronchitis.

## NONATTAINMENT AREA

The Maricopa eight-hour ozone nonattainment area encompasses 4,880 square miles in central Arizona. The nonattainment area is shown in Figure 1-1. The area contains portions of twenty-five cities and towns, the Fort McDowell and Salt River Pima-Maricopa Indian Communities, and unincorporated areas under the jurisdiction of Maricopa County. The southeastern portion of the nonattainment area also includes Apache Junction area in Pinal County. The eight-hour ozone nonattainment area does not include the Gila River Indian Community.

According to a Special U.S. Census, the population of Maricopa County was 3.7 million in 2005. Most of these residents live and work within the nonattainment area boundaries.

Figure 1-1 Eight-Hour Ozone Nonattainment Area



The nonattainment area is located in the Salt River Valley at 1,100 feet above mean sea level and is almost completely surrounded by mountains. The climate in the nonattainment area is arid continental, with temperatures ranging from a mean of 52 degrees Fahrenheit in January to 91 degrees, in July. The sun shines 86 percent of the time and the annual rainfall is about 7.44 inches. In general, the prevailing wind direction is from E/SE to W/SW, although the winds can shift in the afternoon to a more westerly direction.

## HISTORY

In accordance with the Clean Air Act, an urbanized portion of Maricopa County was formally designated as a nonattainment area for one-hour ozone in 1978. The boundaries of the one-hour ozone nonattainment area are shown in Figure 1-1. Under the 1990 Clean Air Act Amendments, the nonattainment area was classified as Moderate for ozone. In order to meet the Moderate area requirements, the MAG 1993 Ozone Plan for the Maricopa County Area was submitted to the Environmental Protection Agency by November 15, 1993. An Addendum to this Plan containing additional control measures was submitted to EPA in March 1994.

On April 13, 1994, EPA issued an incompleteness finding on the 1993 Ozone Plan and Addendum because the plan failed to include, in fully adopted and enforceable form, all of the measures relied upon in the 15 percent demonstration. This action started a two year FIP clock under CAA Section 110(c) for EPA to promulgate a 15 percent Rate of Progress Federal Implementation Plan. In November 1994 the modeling attainment demonstration for the 1993 Ozone Plan and Addendum was submitted to EPA with a revision to the modeling attainment demonstration following in April 1995. The MAG 1993 Ozone Plan and Addendum, as well as the attainment demonstration, was found complete by EPA on May 12, 1995.

Modeling contained in the Revision to the Modeling Attainment Demonstration for the MAG 1993 Ozone Plan for the Maricopa County Area and Addendum concluded that reductions in NO<sub>x</sub> would increase ozone concentrations and therefore not contribute to attainment of the ozone standard. EPA finalized approval of a NO<sub>x</sub> exemption petition for the Maricopa County Nonattainment Area on April 19, 1995. Section 182 of the CAA allows for an exemption when reductions of oxides of nitrogen (NO<sub>x</sub>) would not contribute to ozone attainment.

On November 6, 1997, the nonattainment area was reclassified to Serious due to failure to attain the ozone standard by November 15, 1996. The Serious Area reclassification was effective on February 13, 1998. Following the outcome of a lawsuit filed to require that EPA enforce the Federal Implementation Plan provisions in Section 110(c), EPA promulgated a Federal Implementation Plan for the 15 Percent Rate of Progress requirement on May 27, 1998.

On December 14, 2000, the Serious Area Ozone State Implementation Plan (SIP) for Maricopa County was submitted to EPA by the Arizona Department of Environmental

Quality. In accordance with Section 110, a completeness finding on the Serious Area Ozone SIP was deemed by operation of law since a determination was not made by EPA within six months of receipt of the plan. The Serious Area Ozone SIP was approved by EPA on June 14, 2005.

On May 30, 2001, EPA determined that the Maricopa County nonattainment area had attained the one-hour ozone standard. The attainment determination was effective June 29, 2001. EPA also determined that the serious area requirements for reasonable further progress, attainment determinations, and contingency measures for the one-hour standard would not apply as long as the area continued to attain the standard.

The MAG One-Hour Ozone Redesignation Request and Maintenance Plan was submitted to EPA in May 2004. On June 14, 2005, EPA approved the One-Hour Ozone Maintenance Plan. On June 15, 2005, EPA revoked the one-hour ozone standard, which was less stringent than the new eight-hour standard.

On April 30, 2004, EPA published the final rule designating eight-hour ozone nonattainment areas, effective June 15, 2004. The Maricopa eight-hour ozone nonattainment area was classified as "Basic" under Part D, Subpart 1, of the Clean Air Act, with an attainment date of June 15, 2009. The attainment demonstration for the Maricopa nonattainment area must be submitted no later than 3 years after the effective date of designation, which is June 15, 2007 [EPA, 2005b].

#### REQUIRED COMPONENTS OF THE ATTAINMENT PLAN

Section 110(a)(2) of the Clean Air Act identifies the following general requirements for State Implementation Plans (SIPs). The eight-hour ozone attainment plan for the Maricopa nonattainment area will be a revision to the Arizona SIP.

- (A) Include enforceable measures and schedules necessary to show compliance (1)
- (B) Monitor and compile data on ambient air quality (2)
- (C) Provide a program to enforce measures in (A) and regulate stationary sources (1),(4)
- (D) Prohibit sources from emitting pollutants that would contribute significantly to nonattainment, interfere with maintenance of the standard, or interfere with Prevention of Significant Deterioration (PSD) or visibility in other states (3)
- (E) Provide assurances that there are adequate resources to implement the plan, nothing in the SIP is otherwise prohibited by law, and the State has responsibility for ensuring adequate implementation (1)
- (F) Stationary source emissions monitoring and reporting (4)
- (G) Provide for emergency powers authority (5)
- (H) Provide for the revisions to the plan (6)
- (I) Meet the applicable requirements of Part D for nonattainment areas (10)
- (J) Meet the requirements of Section 121 (consultation) (9); Section 127 (public notification) (7), and part C (PSD and visibility) (3),(4)

- (K) Perform air quality modeling (8)
- (L) Permitting fees for major stationary sources (4)
- (M) Consultation and participation by local political subdivisions affected by the SIP (9)

The numbers following each SIP requirement listed above refer to the subsection below that describes how the requirements of Section 110(a)(2) are met by this Plan.

(1) Enforcement, Adequate Resources, and Responsibility for Adequate Implementation

The eight-hour ozone attainment demonstration relies on State, County and local commitments to implement control measures in the Serious Area Carbon Monoxide Plan [MAG, 2001], the One-Hour Ozone Maintenance Plan [MAG, 2004], and the Serious Area Ozone SIP [ADEQ, 2000]. Sections 110(a)(2)(A), (C) and (E), concerning plan enforcement and implementation requirements, are addressed in Chapter Eight (page 8-146) and Chapter Eleven (page 11-1) of the Serious Area Carbon Monoxide Plan. In order to comply with these sections, a State law was passed in 1992 which provides an approach for assurances that State and local committed measures will be adequately implemented (A.R.S. Section 49-406 I. and J.).

Regarding committed measures, A.R.S. Section 49-406 G. (passed by the Legislature in 1992) requires that each agency which commits to implement any control measure contained in the State Implementation Plan must describe the commitment in a resolution. The resolution must be adopted by the appropriate governing body of the agency. State law also requires the entity to specify the following information in the resolutions: (1) its authority for implementing the limitation or measure as provided in statute, ordinance, or rule; (2) a program for the enforcement of the limitation or measure; and (3) the level of personnel and funding allocated to the implementation of the measure.

Chapter Eleven of the Serious Area Carbon Monoxide Plan includes resolutions from the MAG member agencies and other implementing entities. The resolutions indicate specific commitments to implement various control strategies. Generally, the authorities of cities and towns to implement the types of measures that they have committed to in their respective resolutions are provided under A.R.S. § 9-240 Powers of Common Council. The general authorities of the County to implement the measures in the commitments are provided under A.R.S. § 11-251 and A.R.S. § 49-478. Copies of these local and county government authorities are included in Chapter Eleven of the Revised Serious Area Carbon Monoxide Plan.

If any person (includes State, County, local governments, regional agencies, and other entities) fails to implement a committed measure, the County would file an action in Superior Court to have the Court order that the measure be implemented. Likewise, the Director of the Arizona Department of Environmental Quality will backstop the County if it fails to implement a committed measure or if the County fails to backstop the local governments and regional agencies (see Appendix C, Exhibit 2, Revised Serious Area



Carbon Monoxide Plan).

(2) Monitoring and Compiling of Data on Ambient Air Quality

Section 110(a)(2)(B) establishes the requirement to monitor, compile, and analyze ambient air quality data. Appendix A, Exhibit 2 of the Serious Area Carbon Monoxide Plan contains the 1992 Memorandum of Agreement for Air Quality Planning [MAG, 2001]. This agreement identifies Maricopa County and the Arizona Department of Environmental Quality as having the primary roles for air quality monitoring, including special purpose air quality and meteorological monitoring for plan development.

Chapter Four of the Serious Area Carbon Monoxide Plan (page 4-5) provides additional evidence that the monitoring requirements for the region are being met through the efforts of Maricopa County and the Arizona Department of Environmental Quality. Arizona Statutes 49-406. Nonattainment area plan and 49-424. Duties of Department provide the regulatory basis for air quality monitoring in the State and any nonattainment areas. Additional information on quality assurance program for the air quality monitoring network operated in the Maricopa nonattainment area is provided below.

Ozone data for the Maricopa County area has been collected and quality-assured in accordance with 40 CFR, Part 58, EPA's "Quality Assurance Handbook for Air Pollution Measurement Systems, Volume II", the Maricopa County and the Arizona Department of Environmental Quality QA/QC Procedures and Quality Assurance Project Plans. The data are recorded in the EPA Air Quality Systems (AQS) database and are also available for public review in air quality monitoring network reviews and assessments produced annually by the Maricopa County Air Quality Department and the Arizona Department of Environmental Quality.

(3) Provisions to Prohibit Sources from Impacting Air Quality in Other States

Section 110(a)(2)(D) requires that a SIP contain adequate provisions prohibiting any source or other type of emissions activity within the State from emitting any air pollutant in amounts which will contribute significantly to nonattainment in, or interfere with maintenance by, any other State with respect to any such national primary or secondary ambient air quality standard; or interfere with measures required to be included in the applicable implementation plan for any other State under Part C to prevent significant deterioration of air quality or to protect visibility. The Arizona Department of Environmental Quality recently submitted to EPA the Arizona Interstate Transport SIP to address the requirements of section 110(a)(2)(D)(i) of the Clean Air Act.

Visibility, as defined in Part C of the Clean Air Act, is currently addressed through a Federal Implementation Plan for the State of Arizona. The lack of proximity to another state makes it unlikely that ozone emissions are transported from the nonattainment area to another state.

**(4) Preconstruction Review for All New and Modified Stationary Sources; Stationary Source Emissions Monitoring; and Permitting Fees for Major Stationary Sources**

The requirements of Sections 110(a)(2)(C), (F), and (L) concerning preconstruction review, emissions monitoring, and permitting fees for stationary sources are addressed by the State in Title 49. Article 2. State Air Pollution Control, and Article 3. County Air Pollution Control, of the Arizona Revised Statutes. Compliance with this requirement is the responsibility of the Arizona Department of Environmental Quality or applicable county agency. Appendix A, Exhibit 2 of the Serious Area Carbon Monoxide Plan contains the 1992 Memorandum of Agreement for Air Quality Planning [MAG, 2001]. This agreement identifies Maricopa County as having the lead role for stationary source emissions control.

Following adoption by the State, Maricopa County adopted new source review regulations designed to prevent significant deterioration of air quality, patterned after the State regulations. The Maricopa County Regulations contain requirements for obtaining installation permits for new major sources located in nonattainment, attainment, or unclassifiable areas. Both the State and Maricopa County new source review regulations are currently in effect.

The Maricopa County Air Pollution Control Regulations contain the regulations that constitute the legal basis for control of air pollution sources in Maricopa County, Arizona. They are adopted to implement the policy set forth in Title 49 of the Arizona Revised Statutes and to fulfill the State's responsibilities under the federal Clean Air Act and its amendments to provide a legally enforceable State Implementation Plan for the attainment and maintenance of the National Ambient Air Quality Standards.

Applicable Maricopa County Air Pollution Control Regulations include; Rule 240 - Permits for New Major Sources and Major Modifications to Existing Major Sources, Rule 241 - Permits for New Sources and Modifications to Existing Major Sources, and Rule 245 - Continuous Source Emission Monitoring.

**(5) Provide for Authority Comparable to that in Section 303 for Emergency Powers**

Section 110(a)(2)(G) addresses the authority for emergency powers. Under Section 303 of the Clean Air Act, upon receipt of evidence that a pollution source or combination of sources (including moving sources) is presenting an imminent and substantial endangerment to public health or welfare, or the environment, the EPA Administrator may bring suit on behalf of the United States in the appropriate United States district court to immediately restrain any person causing or contributing to the alleged pollution to stop the emission of air pollutants causing or contributing to such pollution or to take such other action as may be necessary. If it is not practicable to assure prompt protection of public health or welfare or the environment by commencement of such a civil action, the Administrator may issue such orders as may be necessary to protect public health or welfare or the environment.



Emergency powers for the State of Arizona are addressed under A.R.S. 49-465. Imminent and substantial endangerment, 49-462.07 Violation; injunctive relief, and 49-465 Air Pollution Emergency.

(6) Provide for Plan Revisions to Account for Changes to the NAAQS or When a Plan is Found Substantially Inadequate to Attain a Standard

Section 110(a)(2)(H) requires a plan revision to take into account revisions of such national primary or secondary ambient air quality standard, or the availability of improved or more expeditious methods of attaining such standard, and whenever the Administrator finds that the plan is substantially inadequate to attain the national ambient air quality standard.

A.R.S. 49-404 State Implementation Plan and 49-406 Nonattainment Area Plan provisions provide for State, county, and local agencies to revise the SIP to account for changes to air quality standards or if a plan is found to be inadequate. The applicable documentation for making plan revisions can be found in the Serious Area Carbon Monoxide Plan, Appendix A, Exhibit 2, 1992 Memorandum of Agreement for Air Quality Planning [MAG, 2001].

(7) Meet the Applicable Requirements of Section 127 (Relating to Public Notification)

Section 110(a)(2)(J) requires a plan revision to meet the applicable requirements of Section 127 relating to Public Notification. Public notification procedures followed for the Serious Area Carbon Monoxide Plan are documented in the section, Public Participation in the Preparation of the MAG 1999 Serious Area Carbon Monoxide Plan and MAG 1999 Serious Area PM-10 Plan, in Chapter Ten (page 10-3) [MAG, 2001].

(8) Air Quality Modeling

Section 110(a)(2)(K) provides for the performance of such air quality modeling as the Administrator may prescribe for the purpose of predicting the effect on ambient air quality of any emissions of any air pollutant for which the Administrator has established a national ambient air quality standard, and the submission, upon request, of data related to such air quality modeling to the Administrator.

Chapter Five of this Plan describes the photochemical grid modeling that was conducted to demonstrate attainment of the standard by June 15, 2009. The ozone modeling is described in detail in the Technical Support Document (TSD) for this plan. Chapter Five describes key elements of the ozone modeling, including the attainment date, attainment measures, emissions inventories, and modeled attainment demonstration.

(9) Consultation and Participation by Local Political Subdivisions Affected by the SIP

Evidence for consultation and participation by local political subdivisions affected by the SIP can be found in Chapter Ten, Public Participation in the Serious Carbon Monoxide

Plan (page 10-1) [MAG, 2001]. The decision-making structure of the Maricopa Association of Governments includes twenty-five cities and towns; the Fort McDowell, Salt River Pima-Maricopa, and Gila River Indian Communities; Maricopa County; and the Arizona Department of Transportation. These entities are voting members of the MAG Regional Council which is the decision making body of MAG. The Regional Council adopts the regional air quality plans.

In addition, the MAG member agencies participate in the development of the regional air quality plans through participation in the MAG Air Quality Technical Advisory Committee, MAG Management Committee, workshops, and public hearings. For several years, the MAG member agencies have submitted commitments to implement a wide variety of air quality measures which are included in the plans that have been approved by the Environmental Protection Agency.

Appendix A, Exhibit 2 -1992 Memorandum of Agreement for Air Quality Planning from the Serious Area Carbon Monoxide Plan details the consultation and participation process used in developing the air quality plans.

#### (10) Meet the Applicable Requirements of Part D

Part D, Subpart 1, Section 172(c) of the Clean Air Act specifies the Nonattainment Plan Provisions applicable to this Eight-Hour Ozone Plan. The Plan meets each of the provisions, as discussed below.

##### A. Implement all reasonably available control measures as expeditiously as practicable

In accordance with Section 172(c)(1), the state is required to submit a revision that implements RACM as expeditiously as practicable, including such reductions as may be obtained through the adoption, at a minimum, of RACT. Since the Maricopa nonattainment area is designated as a subpart 1 area for ozone, and expects to show attainment by 2009, RACT is deemed to be met with control requirements associated with a demonstration that the NAAQS is attained as expeditiously as practicable (70FR71612, 11/29/2005, Section IV.G.1). Under the anti-backsliding provisions of 40 CFR 51.905 for areas designated Serious nonattainment for the one-hour ozone standard at the time of designation for the eight-hour standard, the state remained subject to the obligations to implement RACT for the categories of sources identified under Sections 182(a)(2)(A) and (b)(2). On June 14, 2005, EPA approved the One-hour Ozone Redesignation Request and Maintenance Plan for the Maricopa County Nonattainment Area, including the RACT demonstration under Sections 182(a)(2)(A) and (b)(2) [MAG, 2004]. NO<sub>x</sub> RACT was not required in the One-Hour Ozone Maintenance Plan, because EPA approved a NO<sub>x</sub> exemption petition for the nonattainment area on April 19, 1995. The source categories subject to RACT in accordance with Section 172(c)(1) and 40 CFR 51.905 are summarized in Table 1-1.

Table 1-1 Maricopa County VOC RACT Rules and SIP Status

VOC RACT REQUIREMENT	MC Rule(s), SIP Status, and, If approved, Federal Register Citation and Effective Date
<b>Control Techniques Guidelines</b>	
Gasoline Loading Terminals	MC Rule 350: adopted July 13, 1988, revised April 6, 1992; revision approved September 5, 1995 (60 FR 46024), effective October 5, 1995. MC Rule 351: adopted February 15, 1995, approved February 9, 1998 (63 FR 6489).
Gasoline Bulk Plants	MC Rule 350: adopted July 13, 1988, revised April 6, 1992; revision approved September 5, 1995 (60 FR 46024).
Service Stations - Stage I	MC Rule 353: adopted July 13, 1988, revised April 6, 1992; approved February 1, 1996 (61 FR 3578).
Fixed Roof Petroleum Tanks	MC Rule 350: adopted July 13, 1988, revised April 6, 1992; revision approved September 5, 1995 (60 FR 46024).
Miscellaneous Refinery Sources	Negative declaration: submitted December 14, 2000, approved August 26, 2002 (67 FR 54741).
Cutback Asphalt	MC Rule 340: adopted July 13, 1988, revised June 22, 1992, revised September 21, 1992; approved February 1, 1996 (61 FR 3578).
Solvent Metal Cleaning	MC Rule 331: adopted July 13, 1988, revised June 22, 1992, revised June 19, 1996, revised April 21, 2004; approved February 1, 1996 (61 FR 3578), approved February 9, 1998 (63 FR 6489), approved December 21, 2004 (69 FR 76417).
<u>Surface Coating of:</u>	
Cans	MC Rule 336: adopted July 13, 1988, revised September 21, 1992, June 19, 1996, April 7, 1999; approved September 20, 1999 (64 FR 50759).
Metal Coils	MC Rule 336: adopted July 13, 1988, revised September 21, 1992, June 19, 1996, April 7, 1999; approved September 20, 1999 (64 FR 50759).

Fabrics	MC Rule 336: adopted July 13, 1988, revised September 21, 1992, June 19, 1996, April 7, 1999; approved September 20, 1999 (64 FR 50759).
Paper Products	MC Rule 336: adopted July 13, 1988, revised September 21, 1992, June 19, 1996, April 7, 1999; approved September 20, 1999 (64 FR 50759).
Automobile and Light Duty Trucks	Negative declaration: submitted December 14, 2000, approved August 26, 2002 (67 FR 54741).
Metal Furniture	MC Rule 336: adopted July 13, 1988, revised September 21, 1992, June 19, 1996, April 7, 1999; approved September 20, 1999 (64 FR 50759).
Magnetic Wire	Negative declaration: submitted December 14, 2000, approved August 26, 2002 (67 FR 54741).
Large Appliances	MC Rule 336: adopted July 13, 1988, revised September 21, 1992, June 19, 1996, April 7, 1999; approved September 20, 1999 (64 FR 50759).
Leaks from Petroleum Refineries	Negative declaration: submitted December 14, 2000, approved August 26, 2002 (67 FR 54741).
Miscellaneous Metal Parts Surface Coating	MC Rule 336: adopted July 13, 1988, revised September 21, 1992, June 19, 1996, April 7, 1999; approved September 20, 1999 (64 FR 50759).
Surface Coating of Flat Wood Paneling	Negative declaration: submitted December 14, 2000, approved August 26, 2002 (67 FR 54741).
Synthetic Pharmaceutical Manufacture	Negative declaration: submitted December 14, 2000, approved August 26, 2002 (67 FR 54741).
Rubber Tire Manufacture	Negative declaration: submitted December 14, 2000, approved August 26, 2002 (67 FR 54741).
External Floating Roof Petroleum Tanks	MC Rule 350: adopted July 13, 1988, revised April 6, 1992; revision approved September 5, 1995 (60 FR 46024).
Graphic Arts	MC Rule 337: adopted November 20, 1996, submitted February 26, 1997, approved February 8, 1998, (63 FR 6489).

Perchloroethylene Drycleaning <sup>(a)</sup>	Perchloroethylene was delisted as a VOC by EPA <sup>(a)</sup> .
Gasoline Truck Leaks and Vapor Collection	MC Rule 352: adopted November 16, 1992, submitted February 4, 1993, approved September 5, 1995, (60 FR 46024).
Manufacture of High-Density Polyethylene Polypropylene, and Polystyrene Resins	Negative declaration: submitted December 14, 2000, approved August 26, 2002 (67 FR 54741).
Fugitive Emissions from Synthetic Organic Chemical, Polymer, and Resin Manufacturing Equipment	Negative declaration: submitted December 14, 2000, approved August 26, 2002 (67 FR 54741).
Large Petroleum Dry Cleaners	MC Rule 333: adopted June 19, 1996, submitted February 26, 1997, approved February 9, 1998 (63 FR 6489).
Air Oxidation Processes - Synthetic Organic Chemical Manufacturing Industries	Negative declaration: submitted December 14, 2000, approved August 26, 2002 (67 FR 54741).
Equipment Leaks from Natural Gas/Gasoline Processing Plants	Negative declaration: submitted December 14, 2000, approved August 26, 2002 (67 FR 54741).
Synthetic Organic Chemical Manufacturing Industries (SOCMI) - Distillation and Reactor Processes	Negative declaration: submitted December 14, 2000, approved August 26, 2002 (67 FR 54741).
Volatile organic liquid storage	MC Rule 350: adopted July 13, 1988, revised April 6, 1992; revision approved September 5, 1995 (60 FR 46024).
SOCMI batch processes	Negative declaration: submitted December 14, 2000, approved August 26, 2002 (67 FR 54741).
Industrial Wastewater	Negative declaration: submitted December 14, 2000, approved August 26, 2002 (67 FR 54741).
Plastic Parts Coating (for business machines and automobiles)	MC Rule 336: adopted July 13, 1988, revised September 21, 1992, June 19, 1996, April 7, 1999, approved September 20, 1999 (64 FR 50759).
Cleaning solvents	MC Rule 331: adopted July 13, 1988, revised June 22, 1992, revised June 19, 1996, revised April 21, 2004, submitted July 28, 2004; approved February 1, 1996 (61 FR 3578), approved February 9, 1998 (63 FR 6489), approved December 21, 2004 (69 FR 876417).

Offset lithography	MC Rule 337: adopted November 20, 1996, submitted February 26, 1997, approved February 9, 1998 (63 FR 6489).
Shipbuilding and ship repair coatings	Negative declaration: submitted December 14, 2000, approved August 26, 2002 (67 FR 54741).
Wood Furniture	MC Rule 342: adopted November 20, 1996, submitted February 26, 1997, approved February 9, 1998 (63 FR 6489).
Aerospace	MC Rule 348: adopted April 7, 1999, submitted August 4, 1999, approved September 20, 1999 (64 FR 50759).
Architectural and industrial maintenance (AIM) coatings	MC Rule 335: adopted July 13, 1988, submitted January 4, 1990, approved January 06, 1992 (57 FR 354).
<b>Major Sources Subject to RACT</b>	
Fiberglass Boat Manufacturing	Negative declaration: submitted April 21, 2004, approved February 10, 2005 (70 FR 7038).
Rubber Sports Ball Manufacturing	MC Rule 334: adopted June 19, 1996, submitted February 26, 1997, approved February 2, 1998 (63 FR 6489).
Metal Casting	MC Rule 341: adopted August 5, 1994, submitted August 16, 1994, approved February 12, 1996 (61 FR 5287).
Commercial Bread Bakeries	MC Rule 343: adopted February 15, 1995, submitted August 31, 1995, approved March 17, 1997 (62 FR 12544).
Semiconductor Manufacturing	MC Rule 338: adopted June 19, 1996, submitted February 26, 1997, approved February 9, 1998 (63 FR 6489).
Vegetable Oil Extraction Processes	MC Rule 339: adopted November 16, 1992, submitted February 4, 1993, approved February 9, 1998 (63 FR 6489).
Coating Wood Millwork	MC Rule 346: adopted November 20, 1996, submitted February 26, 1997, approved February 9, 1998 (63 FR 6489).
Ferrous Sand Casting	MC Rule 347: adopted March 4, 1998, submitted August 4, 1999, approved June 12, 2000 (65 FR 36788).

Vitamin Manufacturing	MC Rule 349: adopted April 7, 1999, submitted August 4, 1999, approved June 8, 2001 (66 FR 30815).
Automotive Windshield Wiper Fluid	MC Rule 344: adopted April 7, 1999, submitted August 4, 1999, approved November 30, 2001 (66 FR 59699).
Fiberboard for Expansion Joints	VOC RACT by permit (W.R. Meadows): submitted April 20, 2005; approved: June 14, 2005 (70 FR 34357).
Polystyrene Foam Manufacturing	MC Rule 358: adopted April 20, 2005, submitted April 25, 2005; approved May 26, 2005 (70 FR 30370).

NA = not applicable

<sup>(a)</sup> Perchloroethylene was delisted as a VOC effective March 8, 1996 (see 61 FR 4588, February 7, 1996).

Source: Maricopa County VOC RACT Rules and SIP Status. Maricopa County Air Quality Department, May 31, 2007.

**B. Plans shall require reasonable further progress**

In Part D of the Clean Air Act, Section 171 indicates that the term “Reasonable Further Progress” means such “annual incremental reductions in emissions of the relevant air pollutant as are required by this part or may reasonable be required by the Administrator for the purpose of ensuring attainment of the applicable national ambient air quality standard by the applicable date.” RFP is addressed in Chapter Five of this attainment demonstration plan.

**C. Plans shall include a comprehensive, accurate, current inventory of actual emissions from all sources of the relevant pollutant or pollutants in the area and periodic revisions**

The Clean Air Act requires a comprehensive, accurate, and current inventory of actual emissions from all sources. On April 1, 1993, the 1990 base year emission inventory for the Maricopa County ozone nonattainment area was submitted to EPA. Full approval of the inventory became effective on June 26, 1998 (see 63 FR 28898, May 27, 1998). The 1996 base year (July through September 1996) ozone inventory was submitted as part of the Final Serious Area Ozone SIP, Appendix E.

The 1999 Periodic Ozone Emissions Inventory for the Maricopa County Nonattainment Area was included in the One-Hour Ozone Redesignation Request and Maintenance Plan in Appendix A, Exhibit 1. The document includes a complete description of the sources and methodology used to calculate ozone precursor emissions. The 1999 inventory was submitted to EPA in August 2002.

The latest periodic emissions inventory for ozone precursors prepared by Maricopa County was submitted to EPA in 2004. This inventory is included as an Appendix to the TSD for this plan. The Maricopa County Air Quality Department has begun work on the 2005 inventory for ozone precursor emissions, and expects to submit the periodic inventory to EPA during the second half of 2007.

- D. The plan provisions shall identify and quantify the emissions of any pollutant allowed from the construction and operation of major new or modified stationary sources in the area

The TSD for this Plan describes the stationary source emissions, including major new or modified sources. The 2001 and 2002 stationary source emissions used in validating the models for the attainment demonstration were provided by the Maricopa County Air Quality Department. These emissions are consistent with the 2002 Periodic Emissions Inventory for Ozone Precursors [MCAQD, 2004]. The 1992 Memorandum of Agreement for Air Quality Planning found in Appendix A, Exhibit 2, of the Serious Area Carbon Monoxide Plan provides the distribution of responsibilities for local air quality planning [MAG, 2001]. The Maricopa County Air Quality Department regulates stationary sources in Maricopa County through the Maricopa County Air Pollution Control Regulations, including Regulation II - Permit and Fees and Rule 240 - Permit Requirements for New Major Sources and Major Modifications to Existing Major Sources.

Section 172(c)(4) requires an area, in developing its attainment plan, to identify expected emissions increases that will result from new or modified major sources in a "zone to which economic development should be targeted" according to Section 173(a)(1)(B). These provisions effectively allow the State to provide a "growth allowance" for sources in such an area in lieu of the offset requirements under Section 173(a)(1)(A). This is an optional alternative to requiring the acquisition of offsets under Section 173(a)(1)(A). Neither the Maricopa County Air Pollution Control Regulations nor the Arizona Administrative Code provides a growth allowance in such areas.

- E. The plan provisions shall require permits for the construction and operation of new or modified major stationary sources anywhere in the nonattainment area

Maricopa County received SIP approval of its major and minor source NSR program in 1988 (see 53 FR 30220, 53 FR30224, and 53 FR 30238, August 10, 1988). Effective November 22, 1993, EPA delegated Prevention of Significant Deterioration (PSD) authority to Maricopa County via a PSD Delegation Agreement. On August 15, 1994, ADEQ submitted a SIP revision containing portions of the State permitting program that are applicable to major sources, major source modifications, and minor sources. Part of the SIP revision, under a separate cover, included applicable Maricopa County rules, pertinent to the NSR/PSD program. The amendments to Maricopa County Rules 100, 200, 210, 220, 240, and Appendix B were submitted as a revision to the NSR/PSD program. The submittal also requested approval of synthetic minor provisions under Section 112 (l) of the Clean Air Act (CAA). On September 1, 1994, EPA deemed both the ADEQ and Maricopa County SIP revision complete. To assure adequate SIP revisions required by Section



110(a)(2)(E) of the CAA, the Director of ADEQ is authorized under ARS §§ 49-402B to assert jurisdiction over major NSR/PSD and minor NSR sources, excluding those located on Indian Reservations. ADEQ received SIP approval of its NSR/PSD program effective May 3, 1983, and delegation of PSD authority for PM-10, effective March 12, 1999.

- F. The plans shall include enforceable emission limitations and other control measures, means, or techniques, as well as schedules and timetable for compliance to provide for attainment of such standard

All of the measures for which credit is taken in modeling attainment of the eight-hour ozone standard by June 15, 2009 have already been implemented. Legally-enforceable commitments, including the schedules for compliance for these measures, were included in prior EPA-approved plans and programs: the Serious Area CO Plan [MAG, 2001], the One-Hour Ozone Maintenance Plan [MAG, 2004], the modified Arizona Cleaner Burning Gasoline Program, effective April 5, 2004, and the Final Serious Area Ozone State Implementation Plan for Maricopa County, effective June 14, 2005.

- G. Plans shall meet the applicable requirements of Section 110(a)(2)

Nonattainment plans must show that the requirements under Section 110 are met. These requirements specify that the plans must contain enforceable emission limits, monitoring requirements, procedures to prevent interstate pollution problems, adequate resources to carry out the control programs, and other provisions related to the development and administration of effective air pollution control programs. These requirements are listed at the beginning of this section.

- H. States may use equivalent techniques for modeling, emission inventories, planning procedures unless they are less effective than the methods specified by the Administrator.

The provisions of Section 172(c)(8) allow the State to use equivalent techniques for modeling, inventorying, or other planning activities, unless EPA determines that the techniques are less effective. This attainment plan uses models, emissions inventories, and planning procedures that were documented in the eight-hour ozone modeling protocol [MAG, 2005] that was reviewed and incorporates recommendations by Scott Bohning of EPA-Region IX. The modeling protocol adheres closely to EPA guidance [EPA, 2005a].

- I. Provide for specific contingency measures to be undertaken if the area fails to make reasonable further progress, or to attain the NAAQS by the applicable attainment date

Section 172(c)(9) of the Clean Air Act requires that nonattainment plans contain contingency measures. Such measures are to be undertaken without further action by the State or the EPA Administrator if the area fails to make reasonable further progress or meet the standard by the attainment date. Committed measures that have already been implemented may be contingency measures if they are not needed to show attainment and

do not hasten attainment. EPA also allows federal measures to be contingency measures if they are not needed for attainment [EPA, 2005b].

The five contingency measures in the Eight-Hour Ozone Plan are: Area A Expansion (H.B. 2538); Gross Polluter Option for I/M Program Waivers; Increased Waiver Repair Limit Options; Federal Heavy Duty Diesel Vehicle Emission Standards, and Federal Nonroad Equipment Emission Standards. Emission reduction credit for these contingency measures was not taken in modeling attainment of the eight-hour ozone standard in 2008. A description of the contingency measures and their emission reduction benefits is provided in Chapter Five.

The next chapter describes characteristics of the eight-hour ozone nonattainment area. General factors that can impact the levels of eight-hour ozone, such as the geography, climate, population, and transportation systems, are discussed.

## **CHAPTER TWO**

### **DESCRIPTION OF THE NONATTAINMENT AREA**

The Maricopa nonattainment area for eight-hour ozone was formally designated on April 15, 2004. As defined in the Clean Air Act, the term nonattainment area refers to locations which exceed any national ambient air quality standard for any pollutant based upon the data collected through air quality monitoring. A general description of the eight-hour ozone nonattainment area, including a discussion of the geographical location of the area, climate conditions, population, and the existing and planned transportation systems, is provided below.

#### **NONATTAINMENT AREA GEOGRAPHY**

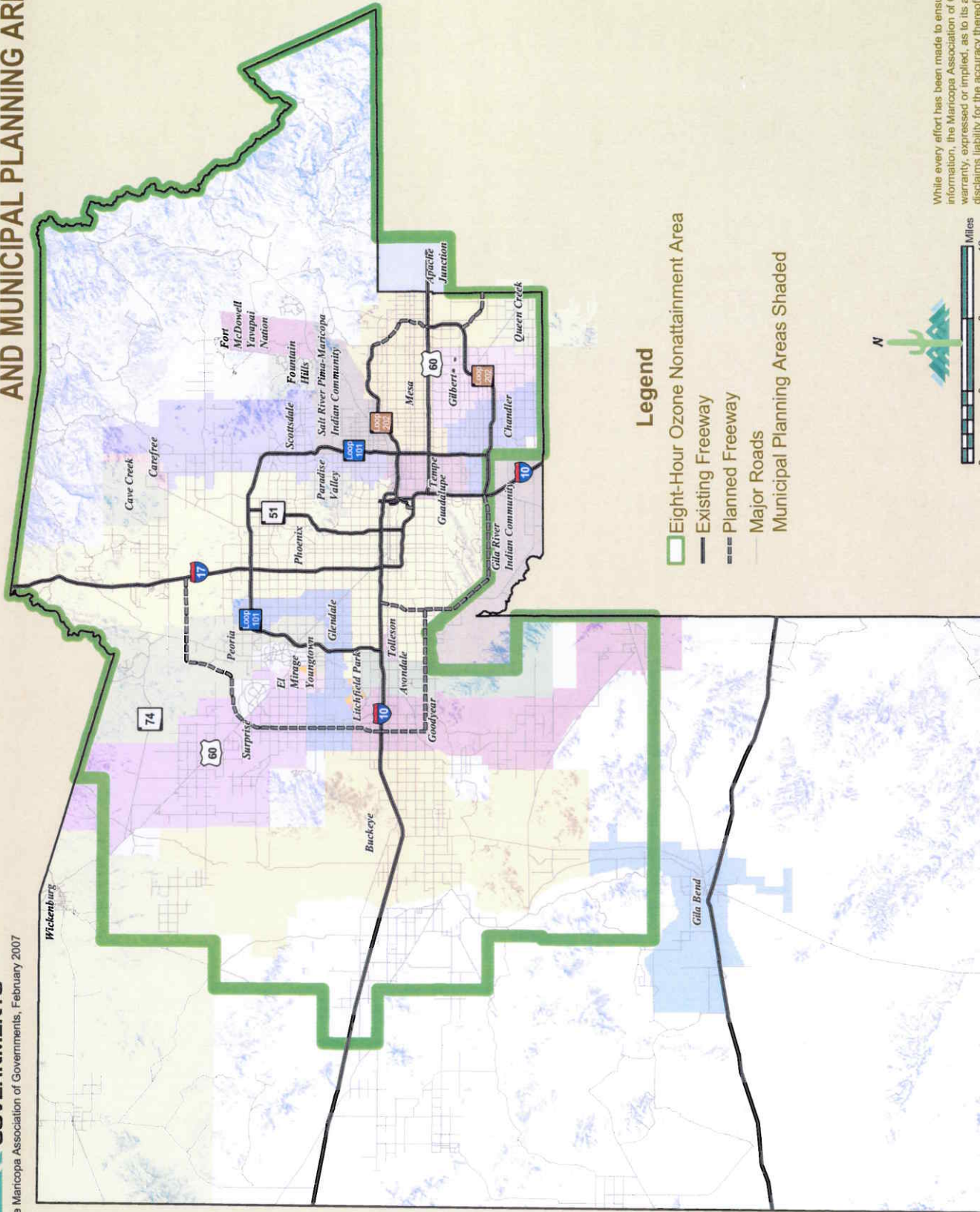
The nonattainment area is located in the Salt River Valley in the central portion of Arizona and encompasses 4,880 square miles. The northern boundary of the area is the Yavapai County line and the southern boundary is located generally along Hunt Highway, excluding the Gila River Indian Community, and approximately six miles north of Interstate 8 at Gila Bend. On the east, the area is bounded by Pinal County and Gila County lines; and on the west by approximately 355<sup>th</sup>, 403<sup>rd</sup>, and 451<sup>st</sup> Avenues. The area contains portions of the municipal planning areas for twenty-five cities and towns, and the Fort McDowell and Salt River Pima-Maricopa Indian Communities, as well as unincorporated areas under the jurisdiction of Maricopa County (see Figure 2-1). The southeastern portion of the area also includes Apache Junction in Pinal County.

The elevation of the Phoenix metropolitan area is approximately 1,105 feet above mean sea level (MSL); however, the elevation in the nonattainment area ranges from 600 feet above MSL near Gila Bend to 7,638 feet above MSL at Four Peaks in the Mazatzal Mountains in eastern Maricopa County. In addition to the Mazatzal Mountains, there are several mountain ranges throughout the nonattainment area. The Salt River Mountains are located on the southern border near the Gila River Indian Community and rise to an elevation of 2,507 feet above MSL. The Sierra Estrella Mountains located in the southwestern portion of the nonattainment area have an elevation of 3,320 feet above MSL. To the west, the White Tank Mountains rise to an elevation of 4,026 feet above MSL and the Phoenix Mountains have an elevation of 2,310 feet above MSL. Additional mountain ranges in the nonattainment area include the Hieroglyphic, McDowell, Maricopa, and Gila Bend Mountains.

There are six main rivers that run through the nonattainment area: the Salt River, Agua Fria River, Gila River, New River, Verde River, and Hassayampa River. These river beds are generally dry, except during torrential rainfall, which happens infrequently.

**Figure 2-1**

# **EIGHT-HOUR OZONE NONATTAINMENT AREA AND MUNICIPAL PLANNING AREAS**



While every effort has been made to ensure the accuracy of this information, the Maricopa Association of Governments makes no warranty, expressed or implied, as to its accuracy and expressly disclaims liability for the accuracy thereof.

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The climate in the nonattainment area is arid continental, experiencing extreme ranges in daily temperatures. Temperatures range from a mean of 55.5 degrees Fahrenheit in December to a mean of 94.8 degrees Fahrenheit in July; the annual mean temperature is 74.2 degrees Fahrenheit. The sun shines approximately 85 percent of the time and the annual average rainfall is 8.29 inches. Most of the rainfall occurs from December through March and during the months of July and August. (Source: National Oceanic & Atmospheric Administration National Data Centers.)

The air flow pattern in the area is typically drainage flow winds in the early morning, transition in the late morning to early afternoon, and upslope flow in the afternoon. That is, due to the heating and cooling effects of the ground surface, the air flow pattern generally exhibits a morning downslope to afternoon upslope cycle. This typical flow cycle virtually traps the air pollutants in the valley. Transport of the air pollutants from the valley to the mountain area can happen during the afternoon upslope flow hours, which is normally about three hours before transition starts. After the transition, the air flow is dominated by downslope flow, bringing the pollutants back to the valley. The average annual wind speed is 6.2 miles per hour.

## POPULATION

In September 2005, the United States Census Bureau conducted a Special Survey of Maricopa County. The purpose of the Survey was to capture the region's rapid population growth since the last decennial census, which was conducted in 2000. Based on the Survey, the population for Maricopa County on July 1, 2005 was 3,681,300. A comparison of the 2005 population figure with the 2000 population figure of 3,096,600 indicates that population has increased by 18.9 percent over the five year period. This area has experienced a high rate of population growth, which is characteristic of metropolitan areas located in the sunbelt.

According to the population projections approved by the MAG Regional Council in June 2003, Maricopa County will continue to grow significantly in the future (see Table 2-1). The 2010, 2020, and 2025 population projections are 4,134,400, 5,164,100, and 5,664,000, respectively. These figures represent a population increase of 33.5, 66.8, and 82.9 percent respectively from 2000. (Source: MAG. Interim Projections of Population, Housing and Employment by Municipal Planning Area and Regional Analysis Zone. July 2003.)

## TRANSPORTATION SYSTEM

The transportation system in the nonattainment area is comprised of freeways, expressways, arterials, collectors, and local streets. In addition, the region is served by public transit systems, which are discussed later in this chapter. Table 2-2 illustrates the breakdown of travel by roadway facility type within the nonattainment area. These estimates were derived from the MAG EMM/2 Travel Demand Model.

TABLE 2-1

**TOTAL RESIDENT POPULATION BY MUNICIPAL PLANNING AREA  
(JULY 1, 2000 AND INTERIM PROJECTIONS JULY 1, 2010 TO JULY 1, 2030)**

<b>MPA</b>	<b>2000</b>	<b>2010</b>	<b>2020</b>	<b>2025</b>	<b>2030</b>
Avondale	37,800	82,100	122,500	141,600	161,400
Buckeye	16,700	58,600	153,400	275,500	380,600
Carefree	3,000	4,000	4,800	4,800	4,900
Cave Creek	3,900	5,100	5,800	9,800	12,900
Chandler	185,300	260,000	286,600	287,000	288,600
County Areas	85,300	92,900	109,900	124,600	138,000
El Mirage	8,700	29,700	31,400	32,200	33,100
Fountain Hills	20,500	24,700	30,400	30,400	30,700
Gila Bend	2,300	2,800	6,000	12,500	17,800
Gila River	2,700	3,200	4,200	4,700	5,200
Gilbert	119,200	202,800	280,300	281,900	290,500
Glendale	230,300	290,400	308,100	309,800	312,200
Goodyear	21,200	61,300	161,100	247,400	330,400
Guadalupe	5,200	5,200	5,500	5,500	5,600
Litchfield Park	3,800	7,000	13,700	13,700	14,200
Mesa	441,800	537,900	617,800	630,300	647,800
Paradise Valley	14,100	15,200	15,700	15,800	15,900
Peoria	114,100	160,800	206,600	232,200	253,400
Phoenix	1,350,500	1,700,300	2,022,500	2,101,600	2,187,500
Queen Creek	7,400	18,900	58,300	73,100	88,100
Salt River	6,500	7,400	7,500	7,500	7,500
Scottsdale	204,300	253,100	287,300	289,600	292,700
Surprise	37,700	115,200	213,300	312,300	395,500
Tempe	158,900	176,400	189,200	192,700	196,700
Tolleson	5,000	6,100	6,200	6,200	6,300
Wickenburg	7,400	7,700	10,000	14,800	16,000
Youngtown	3,000	5,400	6,200	6,300	6,600
<b>Total County</b>	<b>3,096,600</b>	<b>4,134,400</b>	<b>5,164,100</b>	<b>5,664,000</b>	<b>6,140,000</b>

**Notes:**

- Total resident population includes resident population in households and resident population in group quarters (dorms, nursing homes, prisons and military establishments)
- These projections include the Maricopa County portion of Peoria, Queen Creek, and the Gila River Indian Community.
- The City of Apache Junction which became a MAG member in 2002, had a resident population of approximately 40,000 in the year 2000. MAG has assembled databases and compiled placeholder projections based on their input for portions of Pinal County. Based upon their input, the population of Apache Junction is projected to be: 78,000 in 2010; 122,000 in 2020; 142,000 in 2025; and 157,000 in 2030.
- MPA numbers rounded to nearest 100. County numbers may not add due to rounding.
- Please refer to Caveats for Interim Projections for complete notation of this series.

TABLE 2-2

2006 AVERAGE WEEKDAY VEHICLE MILES TRAVELED  
FOR THE EIGHT-HOUR OZONE NONATTAINMENT AREA

Facility Type	Urban	Percent	Rural	Percent	Total	Percent
Freeway	27,361,872	34.13%	4,137,046	44.71%	31,498,918	35.23%
Expressway	1,414,063	1.76%	1,039,339	11.23%	2,453,402	2.74%
Arterial	41,491,563	51.76%	2,759,946	29.83%	44,251,510	49.49%
Collector	2,459,716	3.07%	409,939	4.43%	2,869,655	3.21%
Local	7,437,893	9.28%	906,447	9.80%	8,344,341	9.33%
Total	80,165,107	100.00%	9,252,718	100.00%	89,417,825	100.00%

Note: Totals shown may not equal the sum of individual values due to independent rounding.

Source: MAG EMMME/2 Travel Demand Model.



As estimated by MAG travel demand models, the total regional vehicle miles traveled (VMT) per average weekday within the nonattainment area will grow from 89.4 million in 2006 to 154.2 million in 2026, an increase of 72 percent over the 20 year period (see Figure 2-2). As indicated in Table 2-2 and Figure 2-2, facilities classified as arterial will continue to carry the greatest share of travel, approximately one-half of all VMT. Facilities such as freeways and expressways will accommodate 38-40 percent of total travel. The remaining 11-12 percent of VMT will be carried by collector and local streets.

Increases in population and vehicle miles traveled have contributed to traffic congestion at a number of intersections throughout the MAG area. At the same time, additional roadway capacity has helped to mitigate the impacts of growth in travel demand. Locations of current and future congestion are illustrated in Figures 2-3 and 2-4, respectively, based on the Draft Regional Transportation Plan 2007 Update. It is anticipated that the MAG Regional Council will take action on the 2007 Update in July 2007.

On November 2, 2004, the voters of Maricopa County passed Proposition 400, which authorized the continuation of the existing half-cent sales tax for transportation in the region. This action provides a 20-year extension of the half-cent sales tax through calendar year 2025 to implement projects and programs identified in the MAG Regional Transportation Plan (RTP). The previous half-cent sales tax for transportation was approved by the voters of Maricopa County in 1985 through Proposition 300, and expired on December 31, 2005. The current half-cent sales tax extension approved through Proposition 400 went into effect on January 1, 2006.

As specified in A.R.S. 42-6105.E, 56.2 percent of all sales tax collections will be distributed to freeways and highways; 10.5 percent will be distributed to arterial street improvements; and 33.3 percent of all collections will be distributed to transit. Total half-cent revenues from FY 2007 through FY 2026 are projected to be approximately \$14.1 billion.

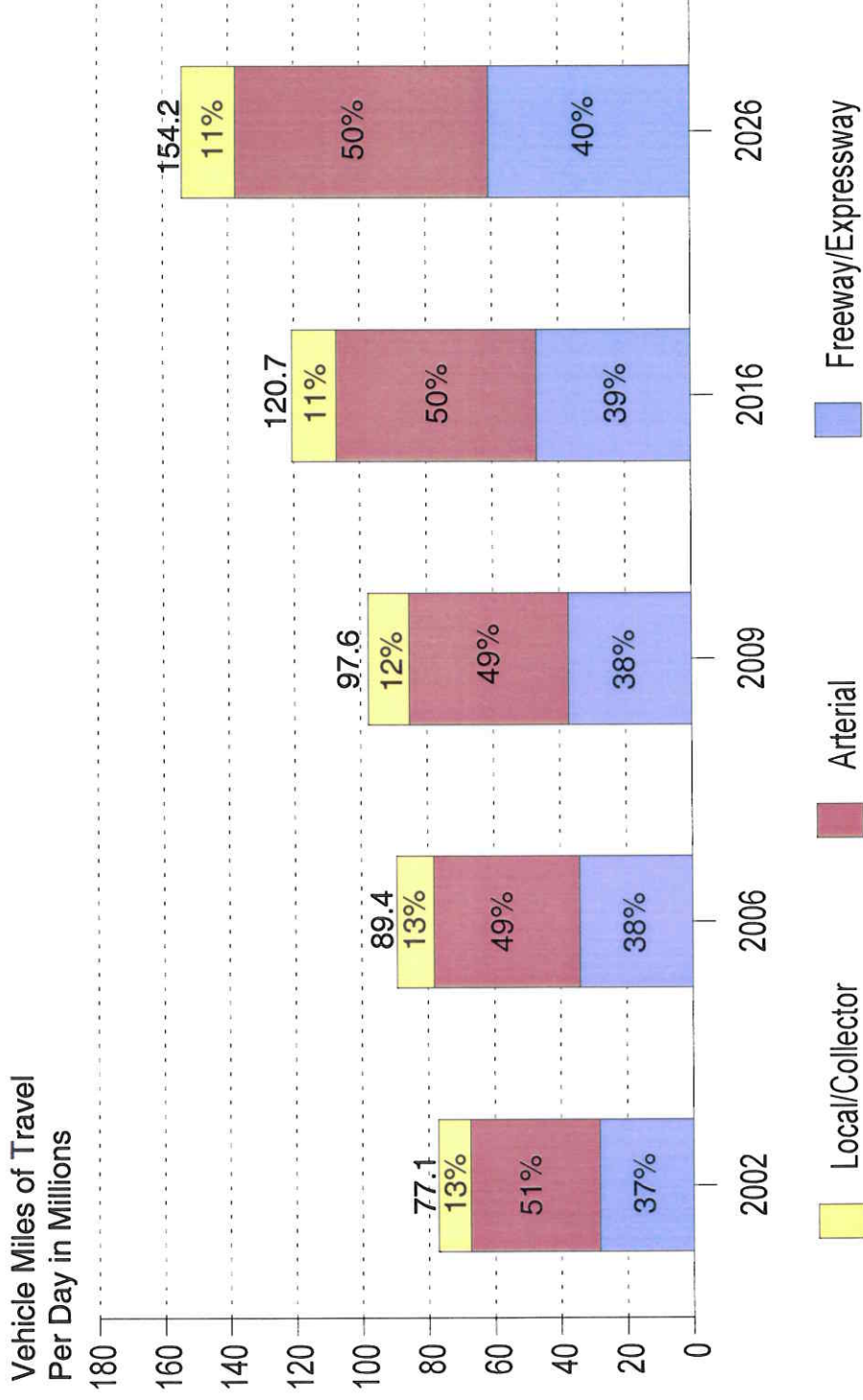
Over the next two decades the existing freeway system will undergo significant expansion as shown in Figure 2-5. Based on the MAG Regional Transportation Plan 2006 Update, funding sources for these improvements include the half-cent sales tax; Arizona Department of Transportation funds; Federal Congestion Mitigation and Air Quality funds; bond proceeds; and other income.

The major freeways presently located in the study area are: Interstate 17 (Black Canyon Freeway), Interstate 10 (Maricopa Freeway), State Route 51 (Piestewa Freeway), US 60 (Superstition Freeway), Loop 101 (Agua Fria, Pima, and Price Freeways), and Loop 202 (Santan and Red Mountain Freeways). The new freeway/highway corridors in the RTP include the I-10 Reliever, Loop 202 (South Mountain Freeway), Loop 303 (Estrella Freeway), the Williams Gateway Freeway, and the Wickenburg Bypass. In 2006, the freeway and expressway system carried 38 percent of vehicular travel in the nonattainment area.



FIGURE 2-2

REGIONAL AVERAGE WEEKDAY TRAVEL PROJECTIONS BY FACILITY TYPE  
FOR THE EIGHT-HOUR OZONE NONATTAINMENT AREA



Note: Totals shown may not equal the sum of individual values due to independent rounding.

Source: MAG EMME/2 Travel Demand Model.

**DRAFT**

Figure 2-3



# 2006 Base Year Network:

## PM Peak Period Hours of Service E & F Level of Service E & F

### Freeway

- Less than 1
- Greater than 1

### Intersections

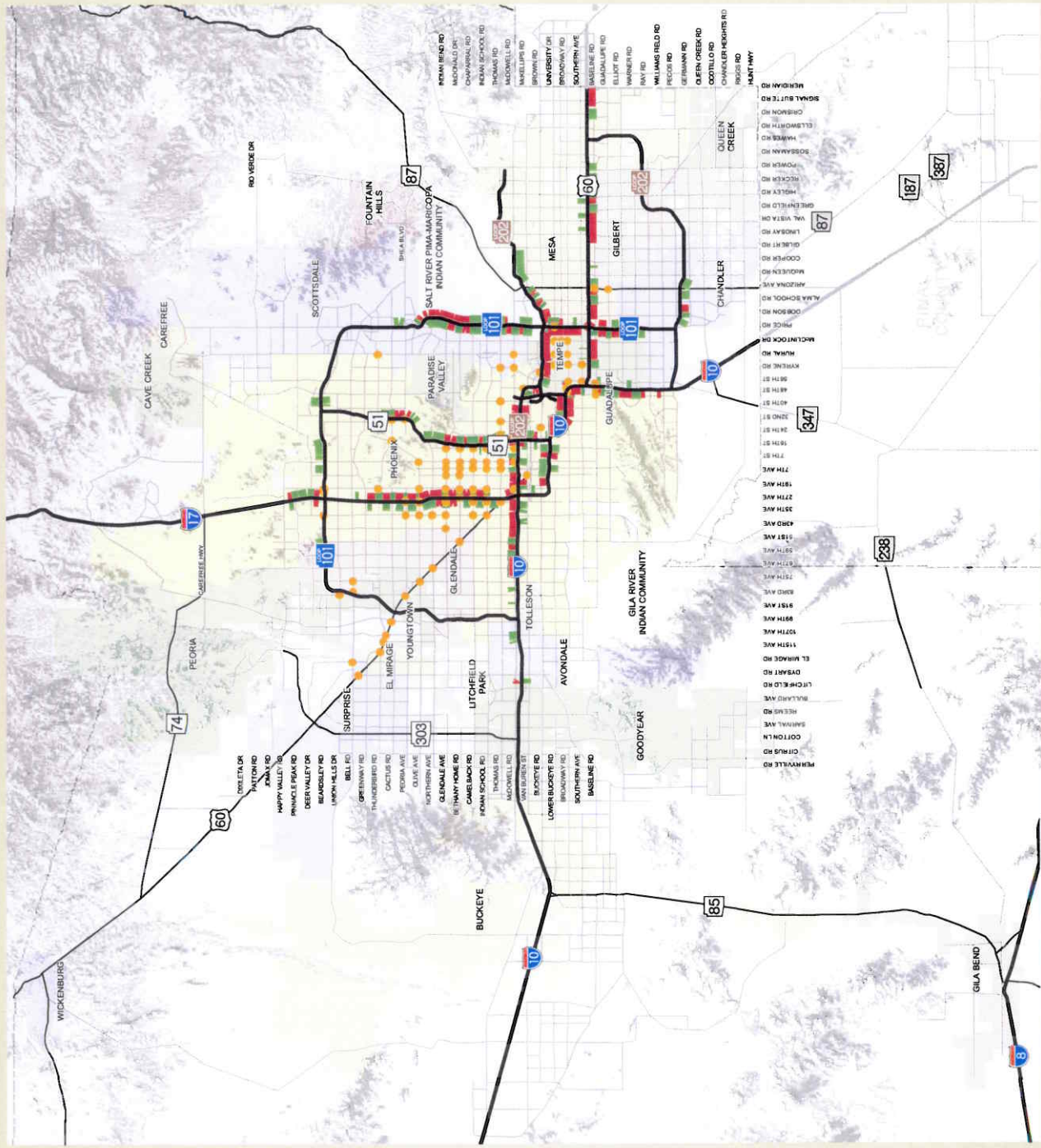
- Level of Service E & F

### Other Features

- County Boundary
- Freeways
- Highways
- Other Roads



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N



SOURCE: Draft Regional Transportation Plan 2007 Update  
While every effort has been made to ensure the accuracy of this information, the Maricopa Association of Governments makes no warranty, expressed or implied, as to its accuracy and expressly disclaims liability for the accuracy thereof.



DRAFT

Figure 2-4



# 2028 RTP Network:

## PM Peak Period Hours of Service E & F Level of Service E & F

### Freeway

- Less than 1
- Greater than 1

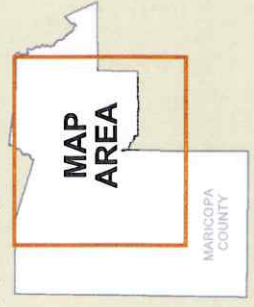
### Intersections

- Level of Service E & F

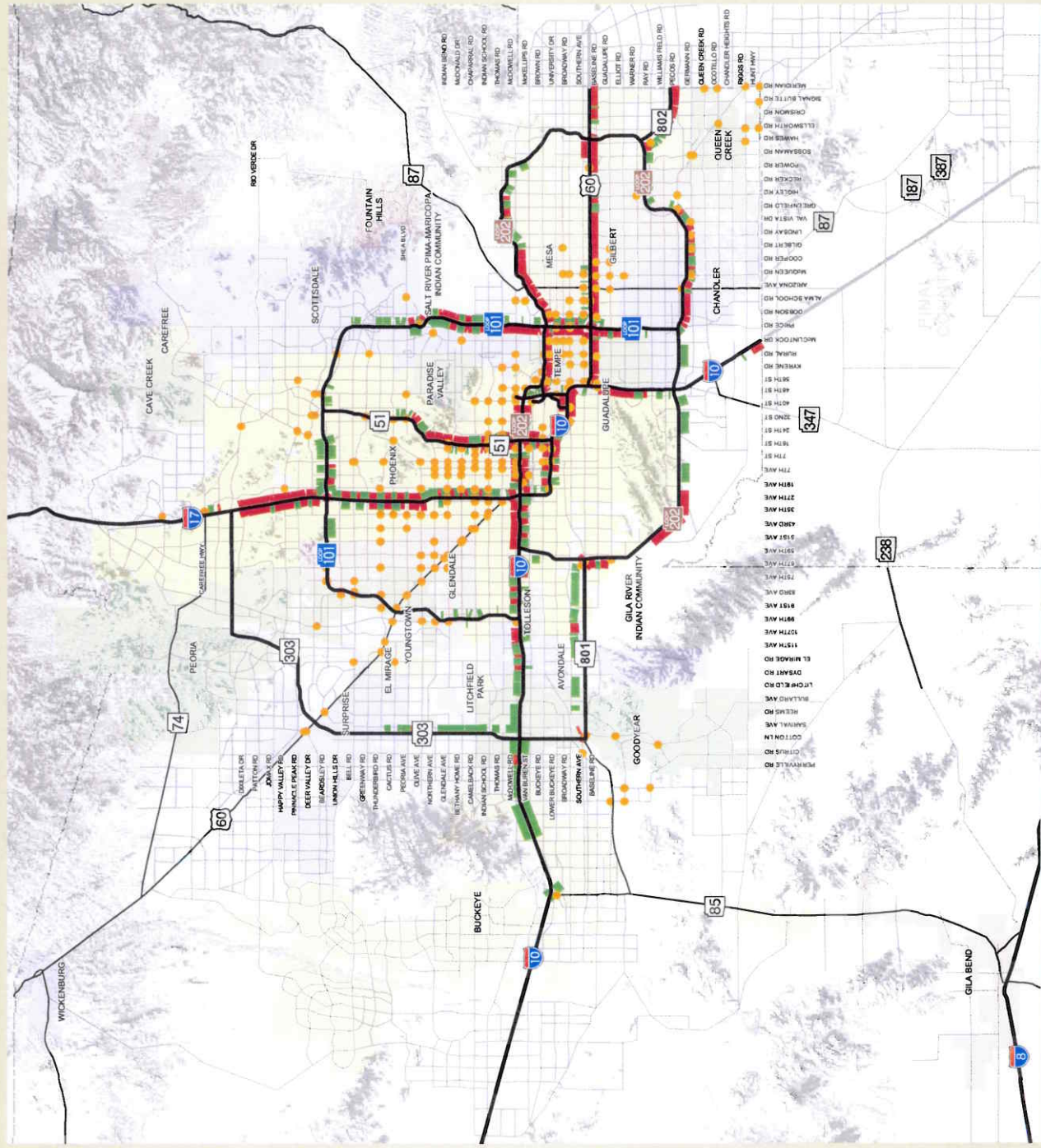
### Other Features

- County Boundary
- Freeways
- Highways
- Other Roads

Alignments for new freeway, arterial, and light rail/high capacity transit facilities will be determined following the completion of appropriate design and environmental studies.



G:\Dev\Maps\RTP\2028\_Plan\_Update\2-4\_2028\_PMI\_05.mxd



SOURCE: Draft Regional Transportation Plan 2007 Update

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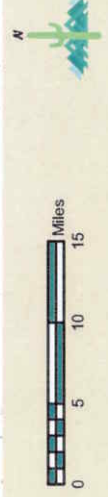




Figure 2-5

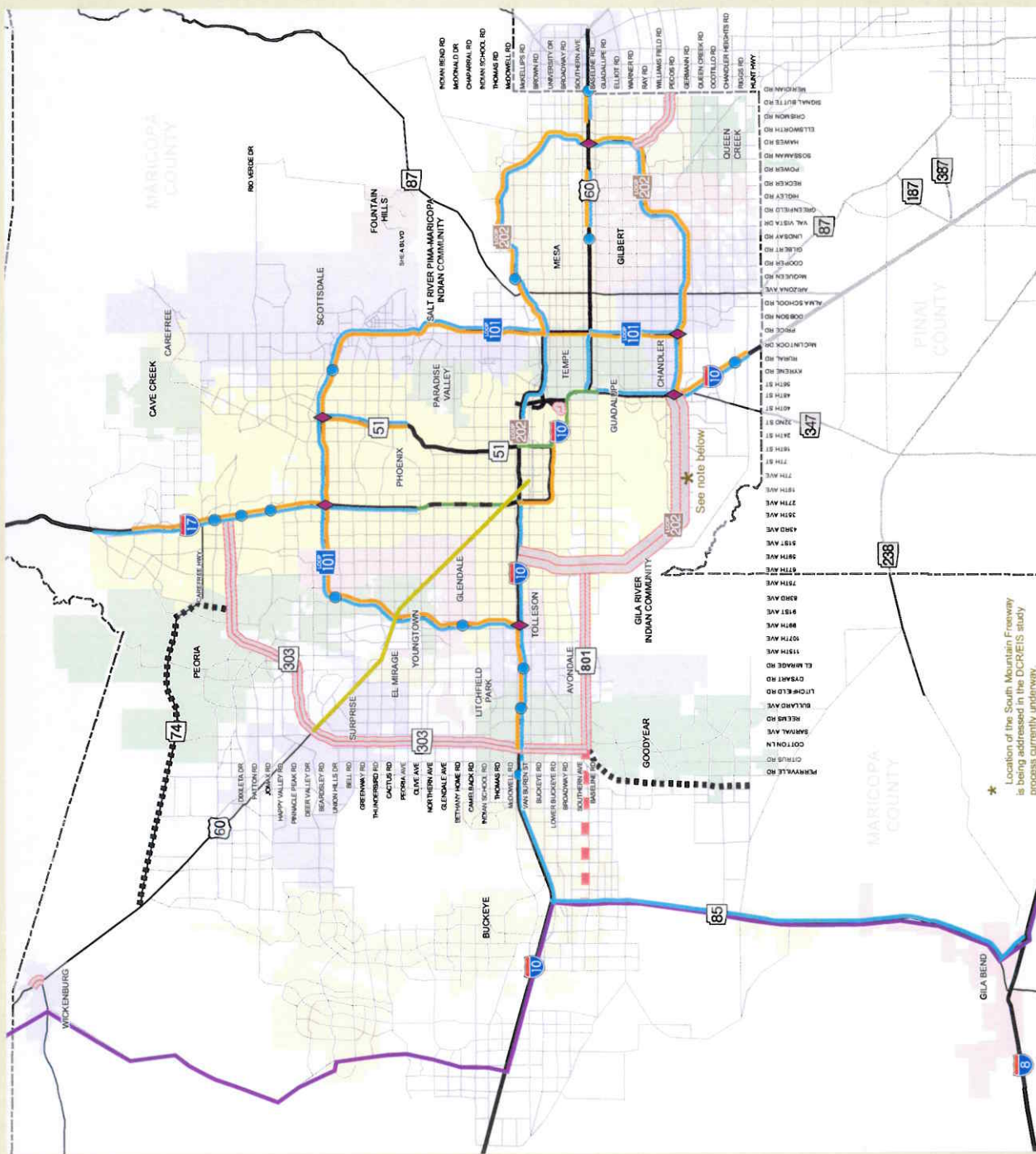


## Freeways/Highways

- New Traffic Interchange
- ◆ New High Occupancy Vehicle Ramp Connection
- Grand Avenue Corridor Improvements
- New High Occupancy Vehicle Lanes
- New General Purpose Lanes
- Corridor Capacity Improvements
- Long Term Capacity Improvements
- New Freeway/Highway Construction
- Interim Corridor Development
- Proposed CANAMEX Corridor
- Right of Way Preservation
- County Boundary
- Existing Freeway
- Other Roads

Alignments for new freeway, highway, arterial, and light rail/high capacity transit facilities will be determined following the completion of appropriate design and environmental studies.

Regional transportation facilities in Pinal County are planned by the Central Arizona Association of Governments (CAAG).



Source: Regional Transportation Plan 2006 Update

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The arterial street network is also a major component of the regional transportation system in the region. This element carries one-half of the vehicle miles traveled in the nonattainment area and provides access to adjacent land uses. Like the freeway system, the arterial network will be undergoing a number of regionally funded improvements in the future (see Figure 2-6).

## CONGESTION MANAGEMENT PROCESS

Although there has been a significant expansion of the freeway system, the construction of freeways alone will not solve traffic congestion problems in the long term. Locations of current and future congestion are illustrated in Figures 2-3 and 2-4. Two primary factors contributing to traffic congestion within the MAG region are an increasing population and a vigorous economy. These factors have resulted in high levels of internal metropolitan growth, and have also brought significant levels of urban development to previously undeveloped lands on the urban fringe. Such internal and peripheral growth has created greater travel demand throughout the region, bringing about higher traffic volumes and congestion on the existing freeway and arterial roadway network. As part of the regional transportation planning effort, MAG maintains a congestion management process to improve traffic flow and mitigate congestion throughout the greater metropolitan area.

The Intermodal Surface Transportation Efficiency Act of 1991 (ISTEA) called for Congestion Management Systems (CMS) within transportation management areas, which are urbanized areas over 200,000 population. In response to ISTEA, MAG has maintained an ongoing process that provides for an overall analysis of various congestion management strategies and their applicability to the region. This process was based on three planning efforts. The first phase included an analysis of traffic congestion and related problems in the region, and was completed in 1991. The second phase included the development of congestion management alternatives, and the final phase, which was initially adopted in September of 1994, involved the full implementation of the CMS through the recommendations of an annual report and the programming of specific improvements in the MAG Five-Year Transportation Improvement Program (TIP).

The MAG CMS is a multimodal planning process that considers a variety of alternative transportation options in an effort to reduce congestion throughout the greater metropolitan region. This is an ongoing process that provides for the identification of congested areas; implements traffic management system projects and defines the continuing process for traffic management in the MAG region; monitors subregional and regional travel patterns; and applies multi-modal transportation improvements and travel reduction efforts to the congested portions of the transportation system. MAG, through the annual review, approval and implementation of numerous plans, including the RTP, and the development of the Five-Year TIP, promotes methods which reduce congestion throughout the region. As part of this effort, MAG prepares an annual Transportation Improvement Program Guidance Report that provides a systematic examination and review of congestion, safety, air quality, socioeconomic data and conditions, system



Figure 2-6



## New/Improved Arterials

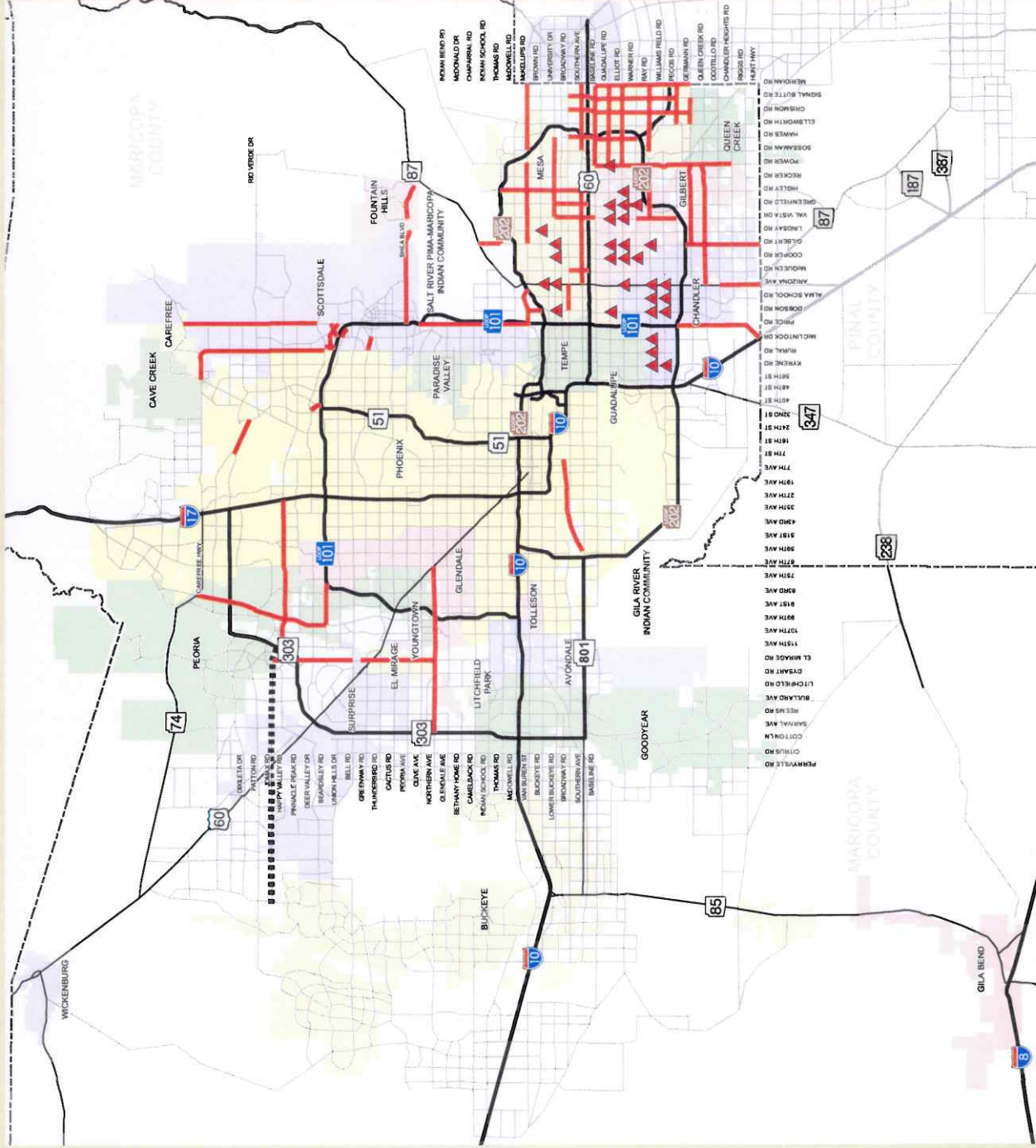
- Improved Intersections
- New/Improved Arterials
- Right of Way Preservation
- County Boundary
- Freeways
- Highways
- Other Roads

Alignments for new freeway, highway, arterial, and light rail/high capacity transit facilities will be determined following the completion of appropriate design and environmental studies.

Regional transportation facilities in Pinal County are planned by the Central Arizona Association of Governments (CAAAG).



G:\Dev\Map\RTTP\2006\_Plan\_Update\07-2\_Improvement.mxd



Source: Regional Transportation Plan 2006 Update

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preservation, and a number of other factors in developing and implementing a regional Transportation Improvement Program and RTP.

On August 10, 2005, the President signed the Safe, Accountable, Flexible, Efficient Transportation Equity Act: A Legacy for Users (SAFETEA-LU). This legislation authorized the nation's surface transportation programs for highways, highway safety, and transit over a five year period between 2005 and 2009. As part of this Act, guidance was provided on the desired features of the congestion management process in transportation management areas. Through the development and implementation of the MAG CMS, an ongoing congestion management process has been established that complies with the features identified in SAFETEA-LU (2005).

### PUBLIC TRANSIT SYSTEM

Publicly-funded fixed route transit service is provided in 15 communities in the MAG Regional Planning Area. The services are provided by private operators including Arnett Transportation Services; Laidlaw Transit Services; Veolia/Regional Public Transportation Authority (RPTA), Veolia/Tempe, Veolia/Phoenix; Total Transit; and Ajo Transportation. Funding for these services is provided by the cities of Avondale, Chandler, Gilbert, Glendale, Mesa, Phoenix, Queen Creek, Scottsdale, Surprise, Tempe, Tolleson and Regional Sales Tax funds.

Sixty-three local routes, 19 express routes, and five circulator routes are operated throughout the region each weekday. Transit service is operated weekdays for approximately 15 hours from 5 a.m. to 8 p.m. The exact hours vary by route, with some service beginning the first trip as early as 4:30 a.m. and some running as late as 12:30 a.m. On Saturdays service hours are from 6 a.m. to 8 p.m., with variations by route. Sunday service is provided on some, but not all routes.

Nine dial-a-ride systems operate within Maricopa County including Glendale Dial-a-Ride, Maricopa County/Red Cross Special Transportation Services (STS), East Valley Dial-a-Ride operated by Arnett Transportation Services, Inc., Peoria Dial-a-Ride, El Mirage Dial-a-Ride, Phoenix Dial-a-Ride operated by Arnett Transportation Services, Inc., Sun Cities Area Transit System (SCAT), Surprise Dial-a-Ride, and Tempe/Scottsdale Dial-a-Ride operated by Mayflower Contract Services. Seven of these dial-a-rides operate within the area in which fixed route bus service is also offered. These dial-a-rides, with scheduled modifications, fully comply with all Americans with Disabilities Act (ADA) complementary paratransit provisions for eligible persons. All dial-a-ride systems plan to continue demand response service to existing passengers, in addition to serving persons certified as ADA paratransit eligible.

The exact hours of dial-a-ride operation vary by system. However, most systems operate weekday service between 7 a.m. and 5 p.m., with some service being provided as early as 6 a.m. and as late as 7 p.m. Saturday service is provided by four of the dial-a-ride systems, while service on Sundays and holidays is limited to East Valley Dial-a-Ride

(Mesa service only), Phoenix Dial-a-Ride, and SCAT. In addition, ADA complementary paratransit is provided by six dial-a-ride systems, with days and hours of operation parallel to fixed route service.

The Maricopa County/American Red Cross Special Transportation Services operates a prescheduled service. Transportation is provided for qualified persons for specific trip purposes in portions of Maricopa County unserved by other systems. This provides outlying areas of the region with needed transportation services.

Vans owned by RPTA provide vanpool services for commuters who live and/or work in Maricopa County through a contract with Vanpool Services Incorporated (VPSI). VPSI provides insurance, vehicle maintenance, billing, and National Database reporting for the program. The Valley Metro Vanpool program serves 6-15 people by providing a fully insured and maintained Agency owned van for which the users pay a monthly fare based on mileage, number of riders and type of van. Each vanpool group has three volunteer drivers, one primary and two alternates, who drive the van. Decisions are made by the vanpool group about their vanpool such as the route to work, pick up spots, times of operation, fare payment, excreta. The vanpool agreement is not a lease or contract and vanpools may terminate with a thirty-day notice.

Fixed route, scheduled service is provided to an area of approximately 600 square miles within the MAG Regional Planning Area by Veolia/RPTA, Veolia/Phoenix, Veolia/Tempe, and Laidlaw. In FY 2005-06, a total of 55,832,297 passengers rode these systems. During this period, 55,832,297 miles were driven for a total of 1,861,464 hours by fixed route service vehicles.

Valley Metro fixed route service is provided by five different entities:

- During FY 2005-06, the City of Phoenix Transit System carried a total of 44,182,683 passengers. The system logged 20,276,910 miles and a total of 1,166,967 hours were spent in service during the year.
- Veolia/RPTA transported 6,484,886 passengers during FY 2005-06. Veolia/RPTA buses traveled 4,956,352 miles in 389,349 hours during FY 2005-06.
- The Scottsdale Connection carried 154,456 passengers in FY 2005-06. The Connection provided 609,772 miles of service in 27,701 hours during FY 2005-06.
- Veolia/Tempe reported 5,063,284 passenger boardings in FY 2005-06. They provided 5,063,284 miles of service in 297,027 hours during FY 2005-06.
- Glendale GUS reported 101,444 passenger boardings in FY 2005-06. They provided 142,109 miles of service in 9,117 hours during FY 2005-06



Demand response and ADA paratransit service is provided in the MAG Regional Planning Area by Glendale Dial-a-Ride, Maricopa County STS, Paradise Valley Dial-a-Ride, El Mirage Dial-a-Ride, Peoria Dial-a-Ride, Phoenix Dial-a-Ride, Southwest Valley Dial-a-Ride, SCAT, Surprise Dial-a-Ride and East Valley Dial-a-Ride. In FY 2005-06, 938,879 passengers boarded these systems. In this same fiscal year, 658,989 hours of service were provided.

The Valley Metro Vanpool program has experienced significant growth from a modest beginning in 1989. There were only 34 vanpools in 1993, the first recorded record of vanpools on the road. At the end of January 2007, there were 310 vanpools operating in Maricopa County, all of which commute into the Phoenix Metropolitan area with the exception of a handful that commute to areas outside of the area, Palo Verde, Hayden, and Casa Grande. From FY 04-05, 229 vanpools, to FY 05-06, 291 vanpools, the vanpool program experienced a 27 percent growth rate. January 2007 statistics reflect that Valley Metro Vanpools commute an average of 72 miles daily, and save 3,460,280 vehicle miles not traveled in single occupancy vehicles. Those same vanpools save 121,109 pounds of pollution from being emitted into the Valley's air monthly.

In 2003, the MAG Regional Council adopted the RTP, which provided a blueprint for a series of freeway, arterial street, and transit improvements that would be implemented in the valley over the next twenty years. This was followed by the passage, in November 2004, of Proposition 400 which reauthorized an existing county-wide sales tax to 2025. The sales tax will provide a regional funding source to fund implementation of the transportation improvements identified in the RTP. The Regional Bus Rapid Transit/Express transit services and the Regional Grid transit services are depicted in Figures 2-7 and Figure 2-8, respectively. The transit program identified in the RTP will supplement locally funded programs identified in the Cities of Phoenix, Tempe, Mesa, Scottsdale, Glendale, Peoria and Surprise.

The Light Rail Transit (LRT) Minimum Operating Segment (MOS) is currently under construction. The approved alignment for the LRT MOS starter segment extends from Bethany Home Road and 19<sup>th</sup> Avenue into downtown Phoenix; from downtown Phoenix to downtown Tempe and Arizona State University; and continuing to the intersection of Main Street and Sycamore in Mesa. The MOS will be completed by December 2008 and service will be initiated through a single opening of the entire system at that time.

The RTP includes regional funding for the completion of six additional LRT segments on the system. These include a five-mile extension to the Rose Mofford Sports Complex (Northwest Extension); a five-mile extension to downtown Glendale (Glendale Extension); an 11-mile extension along I-10 west to 79<sup>th</sup> Avenue (I-10 West Extension); a 12-mile extension to Paradise Valley Mall (Northeast Phoenix Extension); a two-mile extension south of the MOS on Rural Road to Southern Avenue (Tempe South Extension); and a 2.7-mile extension from the east terminus of the MOS to Mesa Drive (Central Mesa Extension). In total, the extensions account for a total of 37.7 miles of the 57.7-mile system. Figure 2-9 depicts the full LRT system envisioned for the region.

Figure 2-7



# Bus Rapid Transit (BRT)

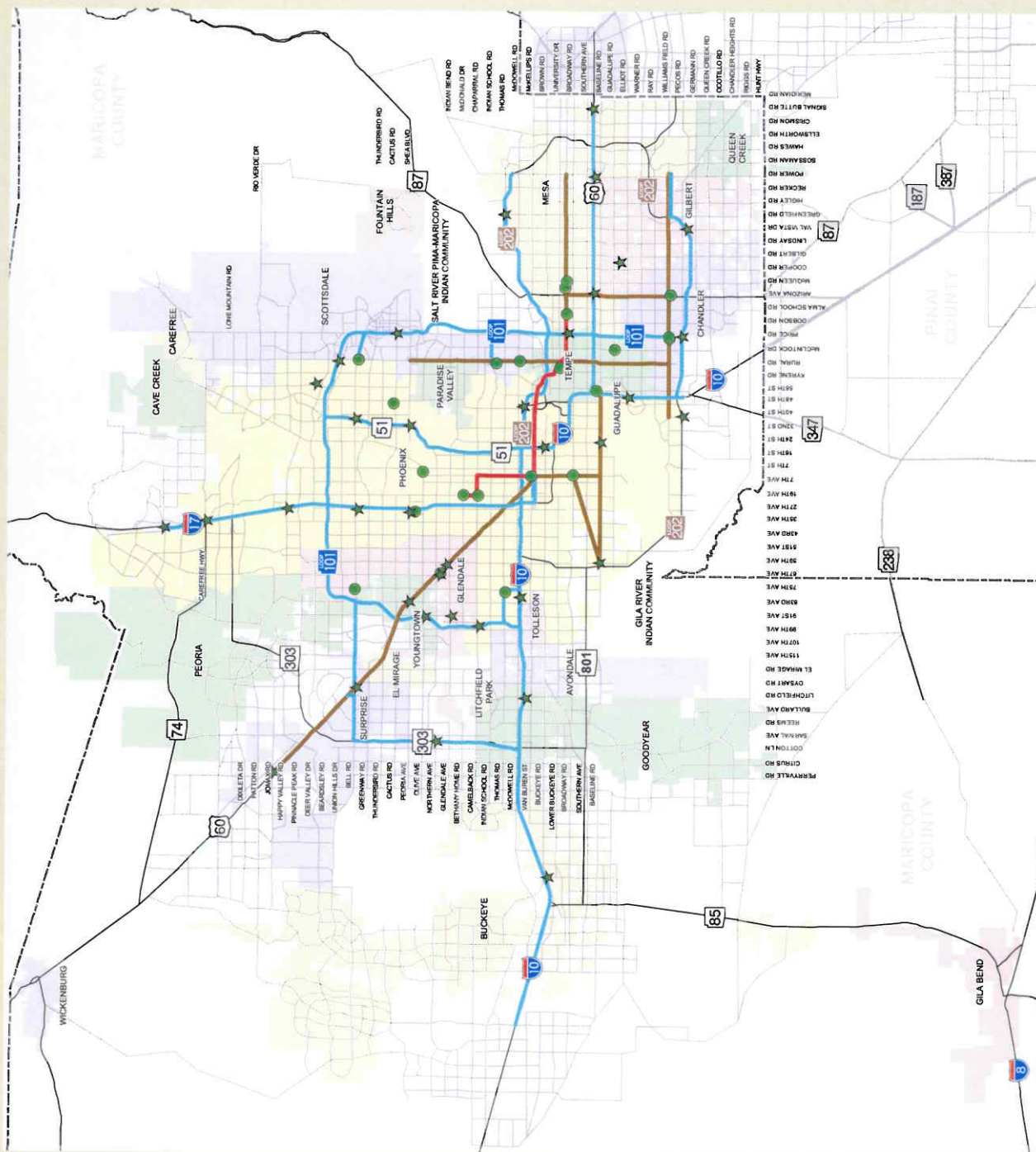
- Approved Minimum Operating Segment
- Arterial BRT Routes
- Freeway BRT Routes
- Planned or Existing Park-and-Rides
- Planned or Existing Transit Centers
- County Boundary
- Freeways/Highways
- Other Roads

Alignments for new freeway, highway, arterial, and light rail/high capacity transit facilities will be determined following the completion of appropriate design and environmental studies.

Regional transportation facilities in Pinal County are planned by the Central Arizona Association of Governments (CAAG).



G:\Dev\MapInfo\TP2006\_Plan\_Update\08-2\_ freeway\_brt.mxd



Source: Regional Transportation Plan 2006 Update

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Figure 2-8

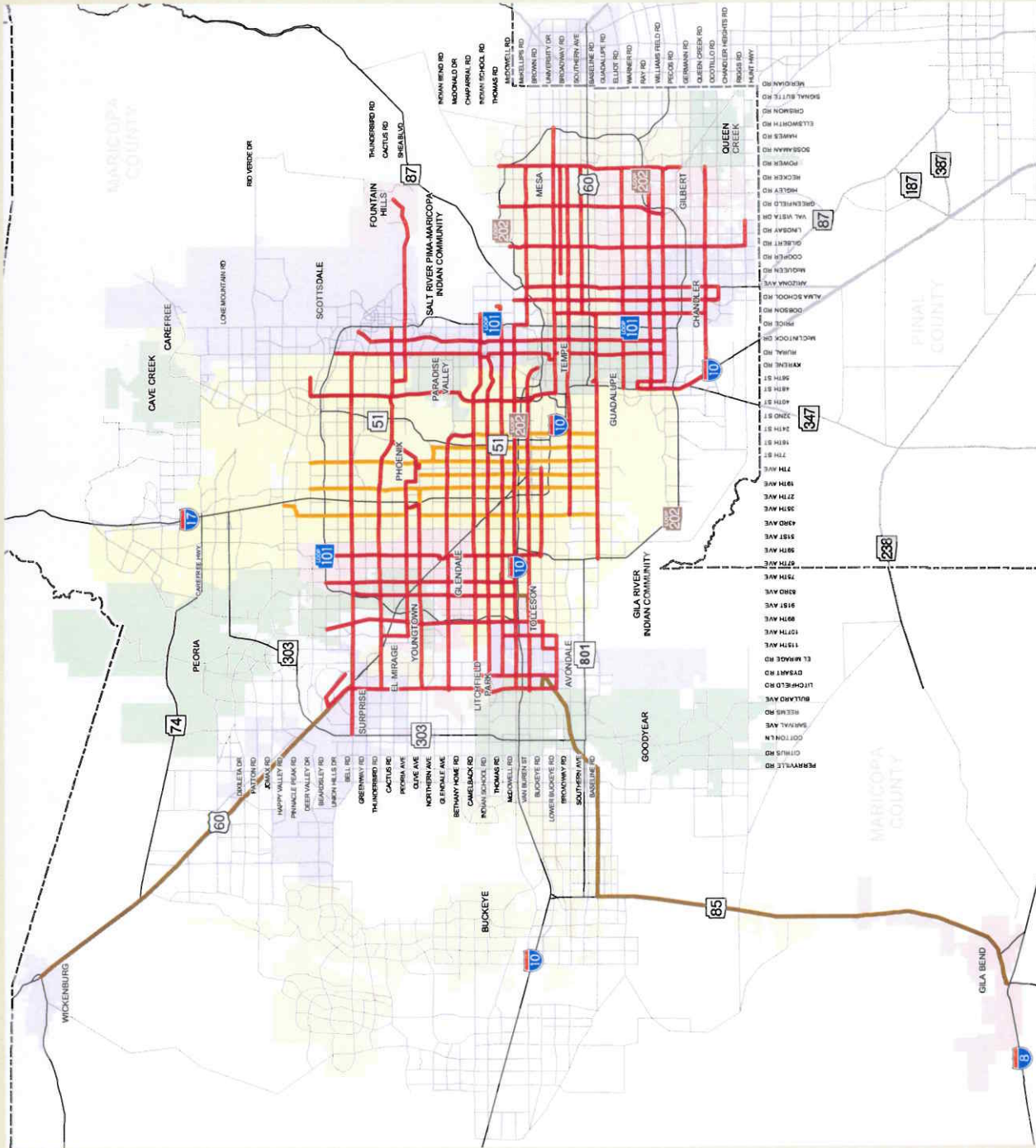


## Super Grid Bus System

- Regional Grid Routes
- Grid Routes Funded by City of Phoenix
- New Rural Routes
- County Boundary
- Freeways/Highways
- Other Roads

Alignments for new freeway, highway, arterial, and light rail/high capacity transit facilities will be determined following the completion of appropriate design and environmental studies.

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Source: Regional Transportation Plan 2006 Update

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Figure 2-9

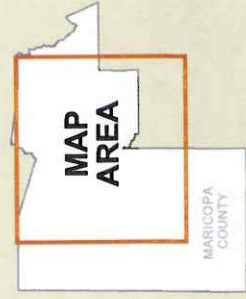


# Light Rail Transit (LRT)/ High Capacity Transit

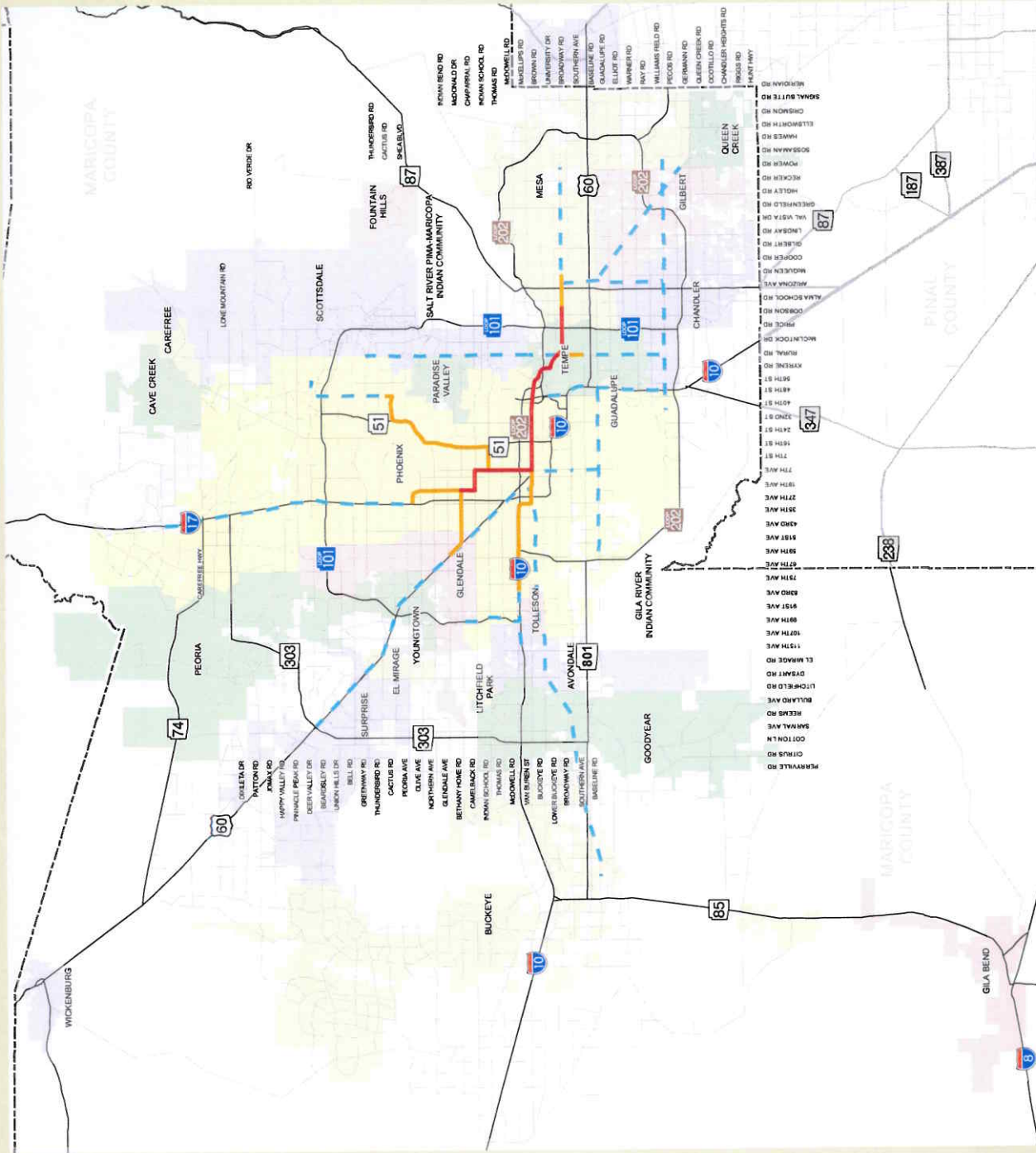
- Approved Minimum Operating Segment
- Light Rail/High Capacity Corridor Extensions
- Eligible High Capacity Corridors
- County Boundary
- Freeways/Highways
- Other Roads

Alignments for new freeway, highway, arterial, and light rail/high capacity transit facilities will be determined following the completion of appropriate design and environmental studies.

Regional transportation facilities in Pinal County are planned by the Central Arizona Association of Governments (CAAG).



GIS/MapInfo/RTD/2006 Plan Update/08-11 Web Cap. Corridors.mxd



Source: Regional Transportation Plan 2006 Update

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## **CHAPTER THREE**

### **ASSESSMENT OF AIR QUALITY CONDITIONS**

In the Maricopa nonattainment area, ozone can be an air pollution problem during the warmest months. Ozone is not directly emitted from a source, but is produced by the mixing of volatile organic compounds (VOCs) and nitrogen oxides (NO<sub>x</sub>) in the presence of heat and sunlight. Precursors to ozone, volatile organic compounds, and nitrogen oxides are emitted from onroad and nonroad engines; industrial, manufacturing and electrical power generation facilities; dry cleaners, service stations, architectural coatings, and consumer and commercial solvent use; and natural vegetation (biogenics). Peak concentrations typically occur from May through September when high temperatures are conducive to the formation of ozone. Also, due to prevailing afternoon winds, ozone and ozone precursors are transported to the mountainous areas east and north of the nonattainment area where elevated levels of ozone may occur.

Ozone irritates the lungs and repeated exposure may cause permanent lung damage. Symptoms of ozone exposure may include wheezing, coughing, and pain when taking a deep breath. Children, persons with pre-existing respiratory conditions such as asthma, and others who are active outdoors when ozone levels are high are most affected by the adverse health effects of ozone. Even low levels of ozone may cause aggravated asthma, reduced lung capacity, and make persons more susceptible to respiratory illnesses like pneumonia and bronchitis.

In order to effectively reduce ozone, it is important to assess air quality conditions in the Maricopa eight-hour ozone nonattainment area. This chapter presents a discussion of ozone formation, sources of ozone precursor emissions, and air quality monitoring data.

#### **OZONE FORMATION**

Unlike other air pollutants, ozone is not directly emitted into the atmosphere. Ozone is formed through a chemical reaction between NO<sub>x</sub> and VOCs in the presence of sunlight. In order for this chemical reaction to take place, it is also necessary to have elevated temperatures and minimal wind speeds.

The nature of the surrounding atmosphere is an important element in assessing air quality conditions. In the Salt River Valley, the climate is arid continental with extreme ranges in daily temperatures. This meteorology is conducive to ozone formation during the months of May through September, when days are typically sunny and daytime temperatures exceed 90 degrees Fahrenheit. Consequently, ozone concentrations tend to rise and exceedances may occur. The highest ozone concentrations tend to occur during the eight-hour period of 9:00 a.m. to 5:00 p.m.

## SOURCES OF OZONE PRECURSOR EMISSIONS

The Clean Air Act requires a comprehensive, accurate, and current inventory of actual emissions from all sources. In 2004, The Maricopa County Air Quality Department compiled a 2002 periodic emissions inventory to determine the sources of VOCs, NO<sub>x</sub>, and carbon monoxide (CO) for Maricopa County and the one-hour ozone nonattainment area. These pollutants are considered ozone precursors. An emissions inventory for determining the sources for the eight-hour ozone nonattainment area has not yet been completed. Since the one-hour ozone nonattainment area was smaller than the eight-hour ozone nonattainment area (1,926 square miles versus 4,880 square miles), the emissions for Maricopa County have been used. Maricopa County is 9,223 square miles.

The 2002 periodic ozone emissions inventory provides average daily emissions which are calculated for a typical day during the three month period from July through September 2002. The inventory also provides annual emissions for the twelve-month period beginning January 1 and ending December 31, 2002 for the categories listed in the inventory.

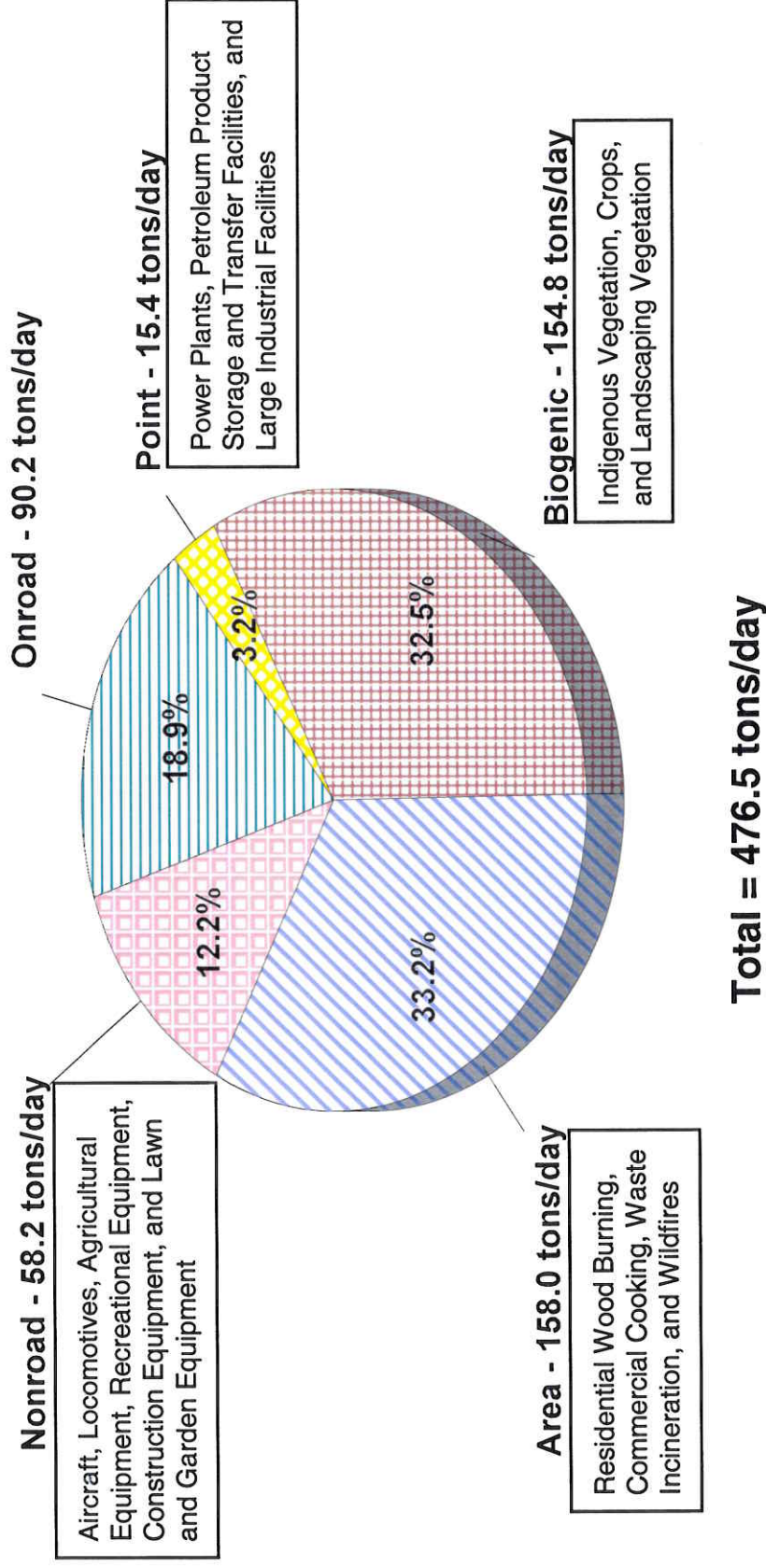
The sources of ozone precursor emissions are grouped into five major categories: Onroad Mobile Sources, Area Sources, Nonroad Mobile Sources, Point Sources, and Biogenic Sources. Collectively, all five categories are estimated to contribute 476.5 (English) tons of VOCs, 381.2 tons of NO<sub>x</sub>, and 2,720.3 tons of CO per day in the 2002 ozone season for Maricopa County; Figure 3-1 shows the relative contribution of each category for VOCs. A complete description of these sources and the corresponding methodology used to calculate the emissions for 2002 are included in the 2002 Periodic Emissions Inventory for Ozone Precursors for the Maricopa County, Arizona, Nonattainment Area, June 2004. This inventory is provided in Appendix A, Exhibit 1.

The onroad mobile source category consists of eight onroad vehicle classes. The estimated 2002 ozone season onroad mobile source emissions in Maricopa County are 90.2 tons of VOCs per day, 218.9 tons of NO<sub>x</sub> per day, and 1,011.7 tons of CO per day. Onroad mobile sources account for 18.9 percent of the average season day VOC emissions, 57.4 percent of the average season day NO<sub>x</sub> emissions, and 37.2 percent of the average season day CO emissions. Table 3-1 includes a breakdown of emissions from all sources in the Maricopa County 2002 Periodic Emissions Inventory for Ozone Precursors.

Area sources include numerous small stationary sources which, when added together, emit significant amounts of ozone precursors. Examples of area sources include residential wood burning, commercial cooking, waste incineration and wildfires. Estimated 2002 ozone season area source emissions for Maricopa County are 158.0 tons of VOCs per day, 30.8 tons of NO<sub>x</sub> per day, and 853.1 tons of CO per day. Area sources account for 33.2 percent of the average season day VOC emissions, 8.1 percent of the average season day NO<sub>x</sub> emissions, and 31.4 percent of the average season day

FIGURE 3-1

## Sources of Volatile Organic Compound Emissions 2002 Periodic Emissions Inventory (Ozone Season Day Emissions)



Notes: Total shown may not equal the sum of individual values due to independent rounding.  
1.00 ton = 0.91 metric tons

TABLE 3-1

**EMISSIONS FROM ALL SOURCE CATEGORIES INCLUDED  
IN THE 2002 PERIODIC EMISSIONS INVENTORY FOR  
OZONE PRECURSORS**

TPY = English Tons/Year TPD = English Tons/Day	VOC		NO <sub>x</sub>		CO	
	(TPY)	(TPD)	(TPY)	(TPD)	(TPY)	(TPD)
<b><u>POINT</u></b>						
Electricity Generation	69.07	0.25	2,783.19	10.39	1,058.25	3.62
Commercial/Institutional Fuel Combustion	6.99	0.03	103.90	0.44	45.63	0.14
Industrial Fuel Combustion	43.99	0.17	481.08	1.66	426.44	1.39
Food/Agriculture	98.76	0.34	---	---	---	---
Industrial Processes	35.21	0.11	60.74	0.17	82.07	0.28
Manufacturing Processes	1,013.62	3.61	65.13	0.23	146.12	0.46
Petroleum Product Storage	19.74	0.06	---	---	---	---
Petroleum Product Transportation/Mktg	550.34	1.47	---	---	---	---
Waste Disposal	40.79	0.12	27.51	0.08	64.40	0.18
Health Services	17.94	0.05	---	---	---	---
Solvent Use	367.47	1.27	---	---	---	---
Surface Coating	1,831.86	7.89	---	---	---	---
<b><u>TOTAL POINT SOURCES</u></b>	<b>4,095.77</b>	<b>15.36</b>	<b>3,521.55</b>	<b>12.97</b>	<b>1,822.90</b>	<b>6.07</b>
<b><u>AREA</u></b>						
Fuel Combustion	3,211.00	0.68	4,560.90	10.31	4,817.71	3.72
Industrial Processes	930.91	3.25	589.86	1.96	412.98	1.22
Solvent Use	31,817.28	105.27	---	---	---	---
Storage/Transport	2,187.56	6.29	---	---	---	---
Waste Treatment/Disposal	655.70	2.48	67.36	0.22	616.30	1.65
Miscellaneous Area Sources	209.46	40.02	95.36	18.30	2976.99	846.53
<b><u>TOTAL AREA SOURCES</u></b>	<b>39,011.90</b>	<b>157.99</b>	<b>5,313.47</b>	<b>30.79</b>	<b>8,823.98</b>	<b>853.11</b>



TABLE 3-1 (Continued)

**EMISSIONS FROM ALL SOURCE CATEGORIES INCLUDED  
IN THE 2002 PERIODIC EMISSIONS INVENTORY FOR  
OZONE PRECURSORS**

TPY = English Tons/Year TPD = English Tons/Day	VOC		NOx		CO	
	(TPY)	(TPD)	(TPY)	(TPD)	(TPY)	(TPD)
<b><u>NONROAD MOBILE</u></b>						
Agricultural	70.60	0.31	477.46	2.07	632.96	2.92
Airport Ground Support	139.57	0.38	147.09	0.40	3,471.09	9.54
Commercial	1,758.91	6.22	1,319.44	3.90	45,797.55	170.02
Construction & Mining	1,786.47	7.67	9,834.69	41.56	15,584.58	71.71
Industrial	361.99	1.23	3,174.80	10.03	15,135.47	52.04
Lawn & Garden	4,523.18	23.21	695.48	2.80	77,273.13	425.52
Logging	20.94	0.07	38.74	0.12	136.54	0.50
Pleasure Craft	600.20	7.71	43.01	0.50	1,423.91	19.56
Railway Maintenance	5.10	0.02	20.35	0.07	61.28	0.24
Recreational	885.25	5.73	63.35	0.33	9,788.20	68.71
Aircraft	1,924.48	5.29	4,187.59	11.50	10,097.03	27.74
Locomotives	136.88	0.38	3,444.32	9.44	344.35	0.94
<b><u>TOTAL NONROAD MOBILE SOURCES</u></b>	<b>12,213.57</b>	<b>58.22</b>	<b>23,446.32</b>	<b>82.73</b>	<b>179,746.09</b>	<b>849.44</b>
<b><u>TOTAL ONROAD MOBILE SOURCES</u></b>	<b>31,960.00</b>	<b>90.19</b>	<b>79,572.00</b>	<b>218.87</b>	<b>352,821.00</b>	<b>1,011.72</b>
<b><u>TOTAL BIOGENIC SOURCES</u></b>	<b>24,152.00</b>	<b>154.76</b>	<b>8,327.00</b>	<b>35.82</b>	<b>—</b>	<b>—</b>
<b><u>TOTAL ALL SOURCES</u></b>	<b>111,433.24</b>	<b>476.51</b>	<b>120,180.34</b>	<b>381.18</b>	<b>543,213.97</b>	<b>2,720.34</b>

Notes: Totals shown may not equal the sum of individual values due to independent rounding.  
1.00 ton = 0.91 metric tons

Source: 2002 Periodic Emissions Inventory for Ozone Precursors for the Maricopa County, Arizona, Nonattainment Area. Maricopa County Environmental Services Department, June 2004.

CO emissions. It is important to note that a wildfire was reported by the Arizona Department of Environmental Quality (ADEQ), in cooperation with the United States Forest Service, that burned 1,000 acres in the Tonto National Forest July 16-18, 2002. In addition, ADEQ reported negligible prescribed fires in Maricopa County in 2002.

Nonroad mobile sources include aircraft, locomotives, and agricultural, recreational, lawn and garden, and construction equipment. Estimated 2002 ozone season nonroad mobile source emissions for Maricopa County are 58.2 tons of VOCs per day, 82.7 tons of NOx per day, and 849.4 tons of CO per day. Nonroad mobile sources account for 12.2 percent of the average season day VOC emissions, 21.7 percent of the average season day NOx emissions, and 31.2 percent of the average season day CO emissions.

The point source category includes stationary sources which emit a significant amount of pollution into the air. Examples of point sources include power plants, petroleum product storage and transfer facilities, and large industrial facilities. A total of 172 point sources are identified in the inventory; 153 are within the one-hour ozone nonattainment area and 17 are located outside the one-hour ozone nonattainment area within Maricopa County. There are two additional point sources within the 25-mile boundary around the one-hour ozone nonattainment area and are located in Pinal County. Estimated 2002 ozone season point source emissions for Maricopa County are 15.4 tons of VOCs per day, 13.0 tons of NOx per day, and 6.1 tons of CO per day. Point sources account for 3.2 percent of the average season day VOC emissions, 3.4 percent of the average season day NOx emissions, and 0.2 percent of the average season day CO emissions.

Biogenic sources consist of emissions from all vegetation in Maricopa County. These sources include indigenous vegetation, crops, and landscaping vegetation. Estimated 2002 ozone season biogenic source emissions for Maricopa County are 154.8 tons of VOCs per day and 35.8 tons of NOx per day. Biogenic sources account for 32.5 percent of the average season day VOC emissions and 9.4 percent of the average season day NOx emissions.

In 2005, MAG contracted with ENVIRON International Corporation to develop a more reliable and accurate biogenic emissions model and update the desert plant emission rates for Maricopa County. Biogenic emissions estimates for the modeling domain have been prepared using the Model of Emissions of Gases and Aerosols from Nature (MEGAN) Biogenic Emissions Inventory System. The MEGAN Model is a biogenic emissions model designed to generate hourly gridded VOC, NOx, and CO emissions. The emission factors used in MEGAN were developed based on the results of a field study to identify prevalent plant species in Maricopa County, including their locations and biomass density. Additional information on the MAG Biogenics Study can be found in Section V of the Technical Support Document.

## AIR QUALITY MONITORING DATA AND TREND ANALYSIS

In addition to identifying sources of ozone emissions, it is important to examine the impact of these emissions on the ambient concentrations. This section includes discussions of the National Ambient Air Quality Standards (NAAQS) and the air quality data recorded by the areawide monitoring network.

In July 1997, the Environmental Protection Agency (EPA) promulgated the eight-hour ozone standard of 0.08 parts per million (ppm). On April 15, 2004, EPA officially designated the Maricopa region as a nonattainment area for eight-hour ozone. The one-hour ozone standard of 0.12 ppm was revoked on June 15, 2005, one year after the effective date of the eight-hour ozone designation.

In order to determine the extent of the regional ozone pollution problem, it is necessary to examine the air quality data collected by the areawide monitoring network. A total of 28 criteria pollutant monitoring stations are currently operated by the Maricopa County Air Quality Department (MCAQD), Pinal County Air Quality Control District (PACQCD), and Arizona Department of Environmental Quality (ADEQ) in the Maricopa County eight-hour ozone nonattainment area. Nineteen of these sites monitor ozone. The Tonto National Monument site is located just outside the nonattainment area in Gila County and also monitors ozone. The network is dispersed geographically so as to monitor air quality in the many diverse physical environments in the region. Land use patterns near the monitoring sites vary from heavy populated urban areas to sparsely populated rural areas. Site-specific information regarding the ozone monitoring stations is provided in Table 3-2, and the geographic location of each site is indicated in Figure 3-2.

Thirteen of the ozone monitoring stations are neighborhood scale sites. These stations record the ambient ozone level present in the neighborhood scale air mass surrounding the monitor. The defined parameter (radius) for neighborhood scale is 0.5 to 4 kilometers. Five of the ozone monitoring stations are urban scale sites and the remaining two are regional scale. The defined parameters for urban scale and regional scale are 4 to 50 kilometers and 10 to 100s of kilometers, respectively. The spatial scale for each ozone monitor station is provided in Table 3-2.

All of the ozone monitors within the network operate continuously (24 hours per day). Ten of the ozone monitors operate on a seasonal basis (April 1 to November 1) and the remaining ten operate throughout the year, with periodic short-duration shutdowns for maintenance and calibration. Each monitoring station is also linked electronically to computers at the agencies operating the monitors. This allows assessments of overall regional air quality to be readily performed by acquiring pollutant concentration data from several different sites.

One method of assessing the overall air quality of a region is to examine the concentrations measured at the monitoring stations. An exceedance of the standard occurs when a monitoring station records a daily maximum eight-hour average value

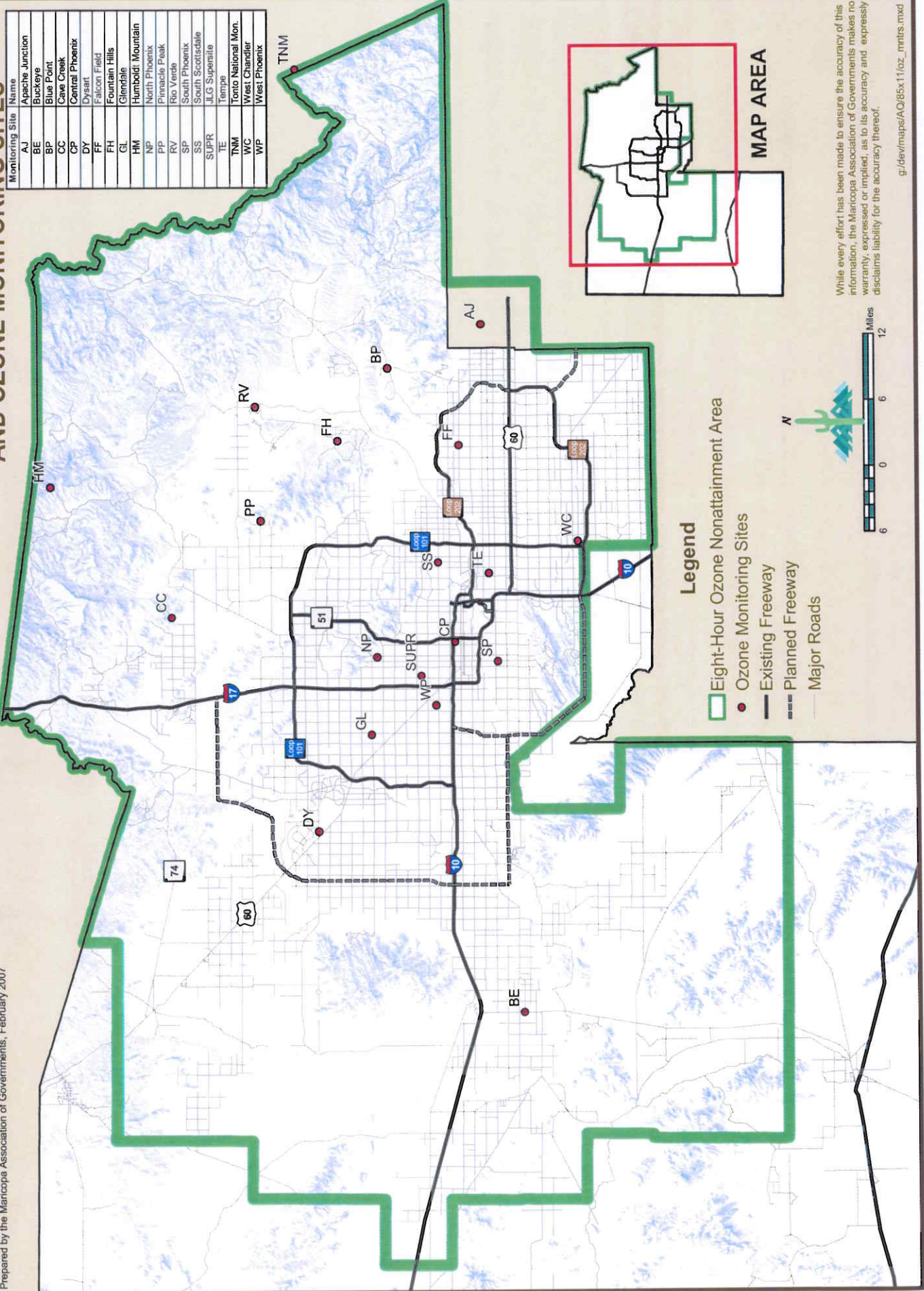
**TABLE 3-2**  
**OZONE MONITORING STATIONS**

<b>FIGURE 3-2 MAP INDEX</b>	<b>SITE</b>	<b>ADDRESS</b>	<b>OPERATING AGENCY</b>	<b>SCALE</b>
AJ	Apache Junction Maintenance Yard	305 E. Superstition	PCAQCD	Neighborhood
BE	Buckeye	26453 W. MC 85	MCAQD	Neighborhood
BP	Blue Point	Usery Pass and Bush Highway	MCAQD	Urban
CC	Cave Creek	37109 N. Lava Lane	MCAQD	Urban
CP	Central Phoenix	1845 E. Roosevelt	MCAQD	Neighborhood
DY	Dysart	16825 N. Dysart	MCAQD/ADEQ	Neighborhood
FF	Falcon Field	4530 E. McKellips	MCAQD	Urban
FH	Fountain Hills	16426 E. Palisades	MCAQD	Neighborhood
GL	Glendale	6000 W. Olive	MCAQD	Neighborhood
HM	Humboldt Mountain	Pine Mountain Wilderness	MCAQD	Regional
NP	North Phoenix	601 E. Butler	MCAQD	Neighborhood
PP	Pinnacle Peak	25000 N. Windy Walk	MCAQD	Urban
RV	Rio Verde	25608 N. Forest Road	MCAQD	Urban
SP	South Phoenix	33 W. Tamarisk	MCAQD	Neighborhood
SS	South Scottsdale	2857 N. Miller	MCAQD	Neighborhood
SUPR	JLG Supersite	4530 N. 17 <sup>th</sup> Avenue	ADEQ	Neighborhood
TE	Tempe	1525 S. College Avenue	MCAQD	Neighborhood
TNM	Tonto National Monument	Tonto National Forest	ADEQ/United States Forest Service	Regional
WC	West Chandler	163 S. Price	MCAQD	Neighborhood
WP	West Phoenix	3847 W. Earll	MCAQD/ADEQ	Neighborhood

Source: ADEQ Air Quality Annual Report 2006; Maricopa County 2005 Air Monitoring Network Review.

**Figure 3-2**

# **EIGHT-HOUR OZONE NONATTAINMENT AREA AND OZONE MONITORING SITES**





greater than or equal to 0.08 ppm. Due to mathematical rounding, values greater than or equal to 0.085 ppm are necessary to exceed the standard. A violation of the standard occurs when the three-year average of the annual fourth-highest daily maximum eight-hour average concentration measured at each site is greater than or equal to 0.085 ppm.

Figures 3-3 and 3-4 summarize the trend for monitors in the nonattainment area with the highest three-year average of the fourth-highest eight-hour ozone concentrations and the number of eight-hour ozone violations recorded since 1999, respectively.

In addition, Table 3-3 provides monitoring data for the most recent three year period (2004-2006). Table 3-4 contains an eight-hour ozone monitoring data summary for the three-year average of the annual fourth-high from 2002-2006. It is important to note that there have been no violating monitors for the last two calendar years (2005 and 2006).

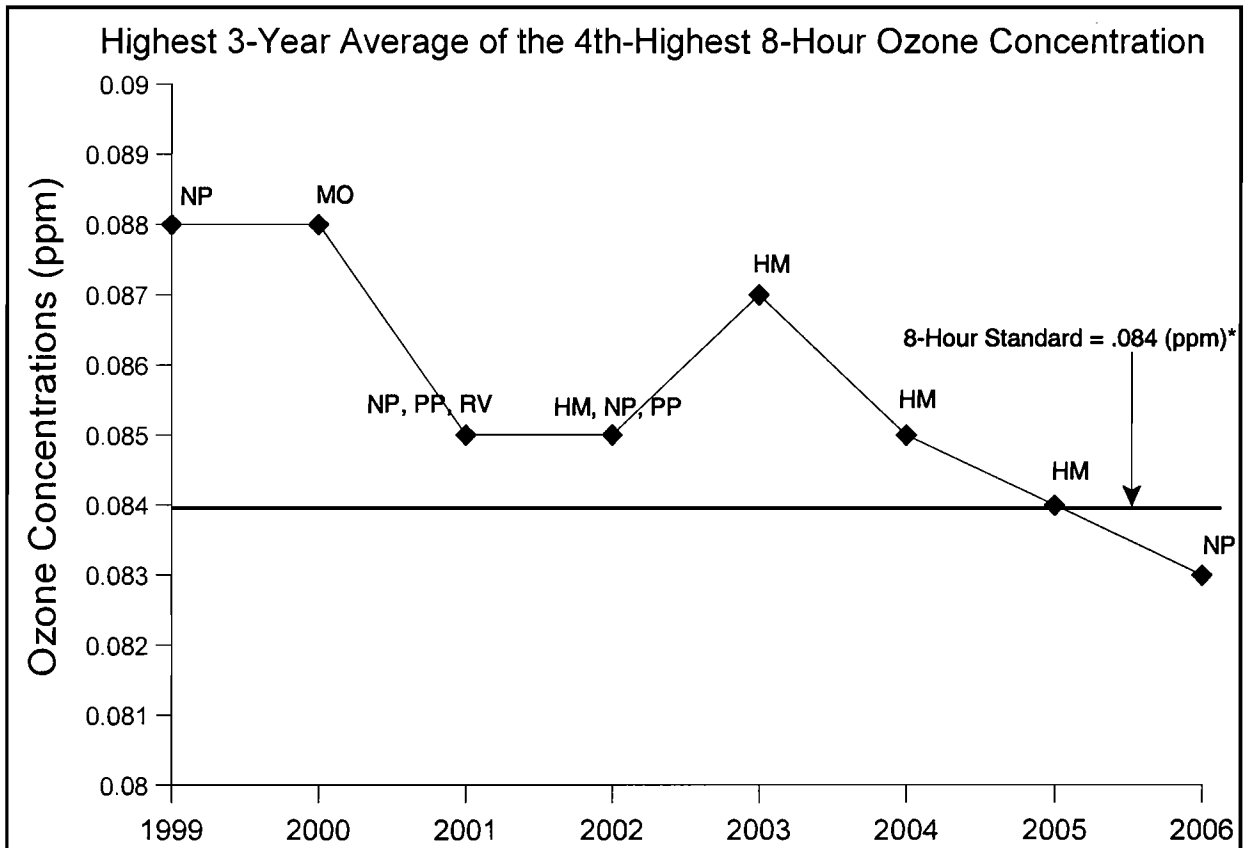
In contrast to the past two years of “clean” data, there were seven violating monitors in 2000. There was a noticeable decrease in the number of violations from 2000 to 2001, with three violations recorded in 2001. During the years of 1999 through 2006, the annual number of ozone violations have ranged from seven (in 2000) to zero (in 2005 and 2006). These data indicate the downward trend in ozone concentrations occurring in the nonattainment area.

The eight-hour ozone concentration data collected by the monitoring network provide an indication of the progress toward attainment made by the MAG region. The North Phoenix monitoring station has recorded the largest number of violations since 1996. The site violated from 1996 through 2003 with three-year averages of the fourth-high ranging from 0.091 ppm in 1997 to 0.085 ppm in 2003. However, the North Phoenix monitoring site has not violated the eight-hour ozone standard in the last three years (2004-2006).

Two of the monitoring sites in eastern and northeastern Maricopa County (i.e. Blue Point and Humboldt Mountain) are located on National Forest Service land. The Rio Verde monitor is also located in a very low density residential area on the edge of a Federal Class I Wilderness Area. High concentrations recorded at these rural monitors in the past may be caused by emissions produced in the urbanized area, as well as biogenic emissions at the rural monitor sites. The emissions from the urbanized area react photochemically in the presence of sunlight, and are transported by the prevailing winds to these remote locations. The Fountain Hills and Pinnacle Peak monitors are also located downwind of the Phoenix metropolitan area and have recorded high ozone concentrations in the past.

In summary, data from the regional monitoring network indicate that the Maricopa County nonattainment area has not violated the National Ambient Air Quality Standard for eight-hour ozone for the past two years. In addition, the magnitude of observed eight-hour ozone concentrations have decreased. This trend is due to the control measures already implemented within the one-hour ozone maintenance area and Area A.

**FIGURE 3-3**  
**EIGHT-HOUR OZONE TRENDS**  
**(1999-2006)**



\* Due to mathematical rounding, values  $\geq .085$  ppm are necessary to exceed the standard.

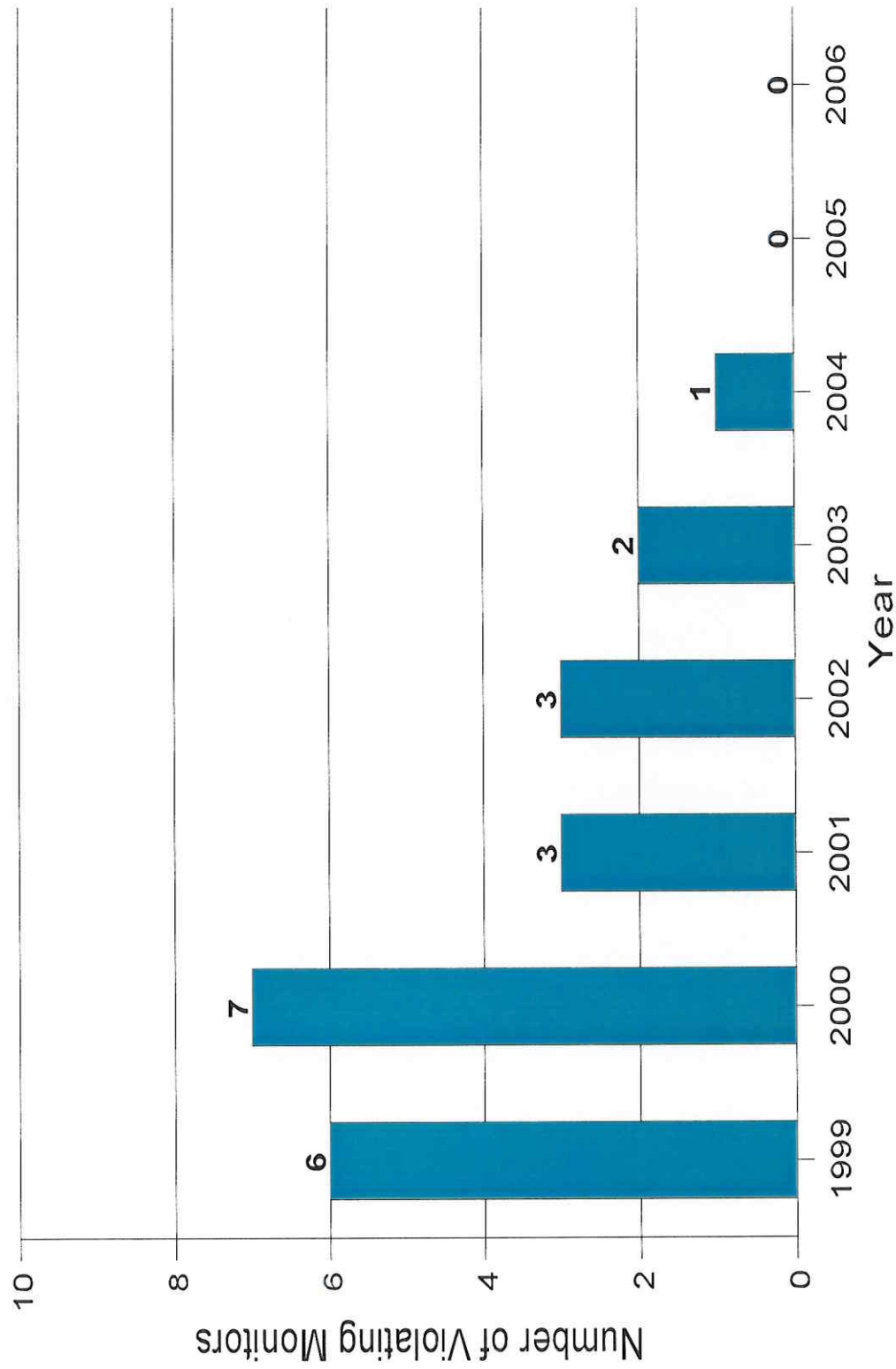
**Monitors Where the Highest 3-Year Average of the 4th-Highest  
 8-Hour Ozone Concentration Occurred**

(HM) Humboldt Mountain  
 (MO) Mount Ord  
 (NP) North Phoenix  
 (PP) Pinnacle Peak  
 (RV) Rio Verde

Source: EPA Monitor Values Report.

FIGURE 3-4

VIOLATIONS OF THE EIGHT-HOUR OZONE STANDARD IN THE  
MARICOPA COUNTY NONATTAINMENT AREA



Source: EPA Monitor Values Report.



TABLE 3-3

EIGHT-HOUR OZONE MONITORING DATA SUMMARY  
THREE-YEAR AVERAGE OF THE FOURTH-HIGH, 2006  
(STANDARD: 8-HOUR: 0.08 PPM\*)

Site	2004 4 <sup>th</sup> High (PPM)	2005 4 <sup>th</sup> High (PPM)	2006 4 <sup>th</sup> High (PPM)	3-Year Avg. 4 <sup>th</sup> Highest (PPM)
Apache Junction	.069	.068	.084	.073
Blue Point	.075	.081	.062	.072
Buckeye <sup>s</sup>	.058 #	.065	.067	.063
Cave Creek <sup>s</sup>	.076	.082	.080	.079
Central Phoenix	.074	.075	.080	.076
Dysart <sup>s</sup>	.065	.066	.072	.067
Falcon Field <sup>s</sup>	.070	.076	.079	.075
Fountain Hills	.075	.088	.084	.082
Glendale <sup>s</sup>	.076	.076	.078	.076
Humboldt Mountain <sup>s</sup>	.078	.087	.079	.081
JLG Supersite	.072	.076	.076	.074
North Phoenix	.080	.084	.085	.083
Pinnacle Peak	.068	.083	.076	.075
Rio Verde <sup>s</sup>	.074	.087	.083	.081
South Phoenix	.072	.076	.069	.072
South Scottsdale	.073	.077	.080	.076
Tempe <sup>s</sup>	.072	.076	.079	.075
Tonto Natl Mon <sup>s</sup>	.077	.084	.081	.080
West Chandler <sup>s</sup>	.070	.075	.081	.075
West Phoenix	.072	.068	.082	.074

\* Due to mathematical rounding, values  $\geq .085$  ppm are necessary to exceed the standard.

# Indicates < 75 percent data available.

<sup>s</sup> Seasonal monitor operating from April 1 to November 1.

Source: EPA Monitor Values Report.

TABLE 3-4

**EIGHT-HOUR OZONE MONITORING DATA SUMMARY**  
**THREE-YEAR AVERAGE OF THE FOURTH-HIGH, 2002-2006**  
**(STANDARD: 8-HOUR: 0.08 PPM\*)**

<b>Site</b>	<b>2000-2002 Avg. 4<sup>th</sup> High (PPM)</b>	<b>2001-2003 Avg. 4<sup>th</sup> High (PPM)</b>	<b>2002-2004 Avg. 4<sup>th</sup> High (PPM)</b>	<b>2003-2005 Avg. 4<sup>th</sup> High (PPM)</b>	<b>2004-2006 Avg. 4<sup>th</sup> High (PPM)</b>
Apache Junction	.080	.076	.073	.069	.073
Blue Point	.084	.084	.082	.080	.072
Buckeye <sup>s</sup>	N/A	N/A	N/A	N/A	.063
Cave Creek <sup>s</sup>	N/A	.084	.081	.080	.079
Central Phoenix	.075	.076	.076	.076	.076
Dysart <sup>s</sup>	N/A	N/A	N/A	.068	.067
Falcon Field <sup>s</sup>	.080	.081	.077	.075	.075
Fountain Hills	.084	.084	.081	.082	.082
Glendale <sup>s</sup>	.080	.082	.081	.079	.076
Humboldt Mountain <sup>s</sup>	.085	.087	.085	.084	.081
JLG Supersite	.077	.076	.074	.074	.074
Maryvale <sup>s</sup>	.079	.080	N/A	N/A	N/A
Mesa	.073	N/A	N/A	N/A	N/A
North Phoenix	.085	.085	.083	.083	.083
Palo Verde <sup>s</sup>	.077	.075	.075	N/A	N/A
Pinnacle Peak	.085	.084	.078	.078	.075
Rio Verde <sup>s</sup>	.084	.083	.080	.081	.081
South Phoenix	.080	.077	.076	.074	.072
South Scottsdale	.079	.079	.077	.076	.076
Surprise <sup>s</sup>	N/A	.072	N/A	N/A	N/A
Tempe <sup>s</sup>	.079	.079	.077	.076	.075
Tonto Natl Mon <sup>s</sup>	N/A	N/A	N/A	N/A	.080
West Chandler <sup>s</sup>	.079	.079	.077	.074	.075
West Phoenix	.080	.078	.077	.072	.074

\* Due to mathematical rounding, values  $\geq .085$  ppm are necessary to exceed the standard.

<sup>s</sup> Seasonal monitor operating from April 1 to November 1.

N/A-Data not available.

Sources: EPA Monitor Values Report; ADEQ FY 2003 Air Quality Report; ADEQ Air Quality Annual Reports 2004-2006.

## **CHAPTER FOUR**

### **THE ADOPTED PLAN**

The overall approach taken in this plan is to demonstrate attainment of the eight-hour ozone standard in the Maricopa nonattainment area with the committed measures in the Serious Area Carbon Monoxide Plan [MAG, 2001], the Carbon Monoxide Maintenance Plan [MAG, 2003], the One-Hour Ozone Maintenance Plan [MAG, 2004], and other air quality plans and programs that have been approved by EPA. The One-Hour Ozone Maintenance Plan demonstrated maintenance of the one-hour ozone standard with these same committed measures in 2006 and 2015.

The carbon monoxide and ozone plans also relied upon EPA-approved programs and plans such as the modified Arizona Cleaner Burning Gasoline Program, effective April 5, 2004, and the Final Serious Area Ozone State Implementation Plan (SIP) for Maricopa County, effective June 14, 2005. The Eight-Hour Ozone Plan relies on these approved control measures, as well.

Although the one-hour ozone standard was revoked by EPA on June 15, 2005, all control measures in the One-Hour Ozone Maintenance Plan remain in effect as legally-binding commitments on the part of the State of Arizona, Maricopa County, and local governments. These permanent and enforceable measures will continue to reduce the volatile organic compounds (VOC) and nitrogen oxides (NOx) that contribute to the formation of ozone. Detailed descriptions of the committed control measures are contained in Chapter Eight of the Serious Area Carbon Monoxide Plan (fifty-five measures), Chapters Two and Three of the Carbon Monoxide Maintenance Plan, and Chapter Two of the Serious Area Ozone SIP.

The measures from the EPA-approved plans and programs have already been effective in reducing ozone in the Maricopa nonattainment area, as evidenced by the fact that there were no violations of the eight-hour standard in 2005 or 2006. Collectively, these existing measures are expected to result in continued attainment of the eight-hour ozone standard in 2008 and beyond.

EPA has recently issued new consumer and commercial product standards under Section 183(e) of the Clean Air Act. The standards go into effect under a phased implementation schedule in 2006 through 2009. These more stringent standards will provide additional VOC reductions and will reinforce the effectiveness of the adopted measures in the Plan. However, the credit for emission reductions was not available in time to be quantified for inclusion in this plan.

Descriptions of the committed control measures in the Plan are organized into three sections below. The first section describes the measures for which numeric credit is assumed in the attainment demonstration. The second section addresses the contingency measures for

which credit has not been taken in modeling attainment. The third section contains measures for which credit has not been quantified, but which remain legally-binding commitments to reduce ozone precursor emissions. All of these measures will assist the nonattainment area in attaining the eight-hour ozone standard by June 15, 2009.

### MEASURES USED FOR NUMERIC CREDIT

The seven attainment measures used for numeric credit in this Plan are: Summer Fuel Reformulation: California Phase 2 and Federal Phase II Reformulated Gasoline with 7 psi from May 1 through September 30; Phased-In Emission Test Cutpoints; One Time Waiver from Vehicle Emissions Test; Coordinate Traffic Signal Systems; Develop Intelligent Transportation Systems; Tougher Enforcement of Vehicle Registration and Emission Test Compliance; and Maricopa County Rule 358: Polystyrene Foam Operations.

All of these measures, except Rule 358, were also quantified for emissions reduction credit in the One-Hour Ozone Maintenance Plan. Rule 358 was included as a commitment in the One-Hour Ozone Maintenance Plan and was subsequently adopted in 2005. Credit for this measure has been quantified for the attainment demonstration.

Maricopa County Rule 348 was a maintenance measure for which credit was taken in the One-Hour Ozone Maintenance Plan. However, since Rule 348 was adopted in 1999, it has been assumed in the base case 2001 and 2002 emissions inventories, rather than as an attainment measure in this Plan.

The attainment measures are described below. The methodologies used to quantify the emissions reduction credit for these measures are described in Section V of the Technical Support Document.

1. *Summer Fuel Reformulation: California Phase 2 and Federal Phase II Reformulated Gasoline with 7 psi from May 1 through September 30*

Arizona Legislature passed H.B. 2307 in 1997 which contains requirements for the sale of gasoline from and after May 1, 1999 in Area A, subject to an appropriate waiver granted under Section 211 (c)(4) of the Clean Air Act, that meets the following fuel reformulation options:

- California Phase 2 Reformulated Gasoline, including alternative formulations allowed by the predictive model, as adopted by the California Air Resources Board pursuant to the California Code of Regulations, Title 13, Sections 2261 through 2262.7 and 2265, in effect on January 1, 1997, that meets the maximum 7.0 psi summertime vapor pressure requirements in A.R.S. Section 41-2083, Subsections D and F.
- Gasoline that meets the standards for Federal Phase II Reformulated Gasoline, as provided in 40 CFR Section 80.41, paragraphs (a) through (h),

in effect on January 1, 1997, that meets the maximum 7.0 psi summertime vapor pressure requirement in A.R.S. Section 41-2083 Subsections D and F.

By September 15, 1997, the Director of the Arizona Department of Environmental Quality in consultation with the Director of the Weights and Measures, is required to adopt rules for the 1998 and 1999 fuel reformulation requirements.

House Bill 2307 also provides that if the Environmental Protection Agency fails to approve the sale and use of both reformulated gasolines, the Director of the Arizona Department of Environmental Quality will adopt standards by rule for one of the following fuels:

- A gasoline that meets standards for Federal Phase II Reformulated Gasoline, as provided in 40 C.F.R. Section 80.41, paragraphs (a) through (h) in effect on January 1, 1997, that meets the maximum vapor pressure requirements of A.R.S. Section 41-2083, Subsections D and F.
- California Phase 2 Reformulated Gasoline, including alternative formulations allowed by the predictive model, as adopted by the California Air Resources Board pursuant to the California Code of Regulations, Title 13, Sections 2261 through 2262.7 and 2265, in effect on January 1, 1997, that meets the maximum vapor pressure requirements of A.R.S. Section 41-2083, Subsections D and F.

On September 29, 2003, EPA published a notice of proposed approval on revisions to the Arizona Cleaner Burning Gasoline (CBG) program. The Regional Administrator for EPA Region IX approved the revisions to the CBG program in the March 4, 2004 Federal Register.

The emission impacts attributable to this measure on a Thursday in June 2008 are a 0.1 metric ton per day increase in VOC and a 10.3 metric tons per day decrease in NOx. This is equivalent to an increase in total base case 2008 anthropogenic emissions of less than 0.1 percent in VOC and a reduction of 3.6 percent in NOx.

## **2. *Phased-In Emission Test Cutpoints***

Arizona Legislature passed H.B. 2237 in 1997 which contains an appropriation of \$120,000 from the State General Fund to the Arizona Department of Environmental Quality to develop and implement an alternative test protocol to reduce the false failure rates associated with the more stringent pass-fail standards for the Vehicle Emissions Testing Program (Section 19 of H.B. 2237).

In 1998, the Arizona Legislature passed S.B. 1427 which requires that vehicles in Area A and B be emissions tested. The vehicles subject to the Vehicle Emissions Inspection Program that have been included within the new boundaries of Area A are

required to comply beginning from and after December 31, 1998. The newest five model year vehicles are exempted from the Vehicle Emissions Inspection Program on a rolling basis. Owners of these vehicles are required to pay an in lieu fee equivalent to the price of the test unless they choose to take and pay for an emissions test. The in lieu fees will be deposited into the Arizona Clean Air Fund. S.B. 1427 also allows the Vehicle Emissions Inspection contract to be extended for three additional years (A.R.S. 49-542, 49-543, 49-545 and Section 41 of S.B. 1427).

The emission reductions attributable to this measure on a Thursday in June 2008 are 3.1 metric tons per day of VOC and 2.6 metric tons per day of NOx. This is equivalent to a reduction in total base case 2008 anthropogenic emissions of 1.2 percent in VOC and 0.9 percent in NOx.

3. *One Time Waiver from Vehicle Emissions Test*

Arizona Legislature passed S.B. 1002 in 1996 which limits the issuance of a waiver for failure to comply with the emission testing requirements to one-time only beginning January 1, 1997.

Also, the Arizona Legislature passed House Bill 2237 in 1997 which requires the Arizona Department of Environmental Quality to submit a report on one-time vehicle waivers to the Governor, President of the Senate, and Speaker of the House of Representatives by September 30, 1997. The report is required to include: a description of the air quality benefits from the measure; recommendations on making the provision more effective, considering the impact on motorists; and recommendations on improving motorists access to the repair grant program.

The emission reductions attributable to this measure on a Thursday in June 2008 are 0.1 metric tons per day of VOC and less than 0.1 metric tons per day of NOx. This is equivalent to a reduction in total base case 2008 anthropogenic emissions of less than 0.1 percent of VOC and less than 0.1 percent of NOx.

4. *Coordinate Traffic Signal Systems*

House Bill 2237 contains an appropriation of \$500,000 in each of fiscal years 1997-1998 and 1998-1999 from the state general fund to the Arizona Department of Transportation for distribution to cities and counties for synchronization of traffic control signals within and across jurisdictional boundaries (Section 23 of H.B. 2237).

In addition, cities and towns responded to measure 97-TC-8, Coordinate Traffic Signal Systems. The synchronization of existing signals, as well as the enhancement of coordination in signal systems which are already synchronized, has been identified by many jurisdictions through a number of programs. Enhancement efforts range from large scale programs covering broad geographic areas to incremental additions

of a few synchronized signals to the network. This includes both individual city projects and regional level programs, such as AZ Tech which is noted under Develop Intelligent Transportation Systems below.

The emission reductions attributable to this measure on a Thursday in June 2008 are less than 0.1 metric tons per day of VOC and less than 0.1 metric tons per day of NOx. This is equivalent to a reduction in total base case 2008 anthropogenic emissions of less than 0.1 percent of VOC and less than 0.1 percent of NOx.

5. *Develop Intelligent Transportation Systems*

Nearly all of the local jurisdictions are planning and implementing advanced technology based solutions to address complex traffic management issues on the regional transportation network. These technologies involve the application of electronics, telecommunications and sensor technologies and are collectively referred to as Intelligent Transportation Systems (ITS).

“Coordinate Traffic Signal Systems,” “Develop Intelligent Transportation Systems,” and “Reduce Traffic Congestion at Major Intersections” are committed control measures in the MAG One-Hour Ozone Maintenance Plan. These measures reduce VOC and NOx emissions by increasing vehicle speeds and reducing congestion.

The mobile source emission reductions attributable to these FY 2003-2006 ITS projects on a Thursday in June 2008 are 2.2 metric tons per day of VOC and 0.4 metric tons per day of NOx. The reductions in anthropogenic emissions attributable to this attainment measure are 0.9 percent for VOC and 0.1 percent for NOx.

6. *Tougher Enforcement of Vehicle Registration and Emission Test Compliance*

Arizona Department of Transportation indicates that this measure would use additional methods to increase the registration compliance of residents. According to the December 1996 Report of the Governor’s Air Quality Strategies Task Force, the Motor Vehicle Division (MVD) of the Arizona Department of Transportation (ADOT) has instituted a comprehensive enforcement program. Three key elements of the new program are a Registration Enforcement Team, a Registration Enforcement Tracking System, and a New Resident Tracking Program. Through public participation, consistent policy and procedure application, and new tracking methods, MVD will enforce the Arizona registration laws to ensure vehicles in question are registered properly. This will be an ongoing effort.

Another phase of the Program is an initiative to coordinate ADOT efforts with other law enforcement agencies to assist MVD personnel in enforcing registration compliance. Other initiatives include a system user agreement between MVD and the City Courts to utilize information in conjunction with registration compliance and

discussions with U.S. West for obtaining information relating to new connect customers.

The Registration Compliance Program began in January 1994 with one full time employee responding only to complaints. In April of 1996, this program was enhanced with five MVD officers periodically conducting a statewide effort locating and issuing warning notices on vehicles suspected of being in violation of Arizona registration laws. This effort resulted in a substantial increase in Vehicle Licenses Tax (VLT) for 1996. As the program continues, there will be an enhanced focus on the local vehicles not in compliance.

Administration of the program began with a required staff time equivalent to one full time employee. Currently, the required staff time is equivalent to eight full time employees. Additional staff requirements for the initial phase of the Registration Compliance Program will require a total of 12 full time (active) employees and one supervisor. The funding allocated for implementation of the Registration Compliance Program is included as part of the overall MVD budget.

Arizona Legislature passed S.B. 1427 in 1998 which requires school districts and special districts in Area A to prohibit parking in employee parking lots by employees who have not complied with emissions testing requirements. Cities, towns, and counties in Area A and Area B are currently subject to this provision (A.R.S. 49-552).

In 1999, the Arizona Legislature passed H.B. 2254 which requires each vehicle that is owned by the United States government and that is domiciled in this state for more than ninety consecutive days and each vehicle that is owned by a state or political subdivision of this state to comply with A.R.S. 49-542.

Collectively, the provisions in H.B. 2254 that apply to Tougher Enforcement of Vehicle Registration and Emissions Test Compliance include A.R.S. 49-557 and 49-541.01 D. and E.

The emissions reduction attributable to this measure on a Thursday in June 2008 is 0.2 metric tons per day of VOC and 0.1 metric tons per day of NOx. This is equivalent to a reduction in total base case 2008 anthropogenic emissions of less than 0.1 percent of VOC and less than 0.1 percent of NOx.

7. *Maricopa County Rule 358: Polystyrene Foam Operations*

Maricopa County adopted Rule 358 on April 20, 2005. This rule limits the emissions of volatile organic compounds from the manufacturing of expanded-polystyrene products. The Rule applies to any facility that expands, ages, or molds expandable polystyrene.



The VOC emissions reduction attributable to this measure on a Thursday in June 2008 is 0.5 metric tons per day. This is equivalent to a reduction in total base case 2008 anthropogenic emissions of 0.2 percent of VOC. This measure has no impact on 2008 NOx emissions.

## CONTINGENCY MEASURES

This section describes the contingency measures for the Eight-Hour Ozone Plan. No emissions reduction credit was taken for these measures in the attainment demonstration and the impact of these measures is not reflected in the 2008 modeling emissions inventory. The five contingency measures include Expansion of Area A Boundaries; Gross Polluter Option for I/M Program Waivers; Increased Waiver Repair Limit Options; Federal Heavy Duty Diesel Vehicle Emissions Standards; and Federal Nonroad Equipment Emissions Standards.

EPA allows the use of federal measures as contingency measures, if credit for these measures is not needed to demonstrate attainment [EPA, 2005b]. All of the contingency measures have been implemented. Early implementation of contingency measures is allowed [EPA, 1993], since it helps to ensure that the standard will be attained as quickly as possible. The methodologies used to quantify the emission reduction impact of the contingency measures are described in Section V of the Technical Support Document. Descriptions of the five contingency measures are provided below.

### 1. *Expansion of Area A Boundaries*

Arizona Legislature passed H.B. 2538 in 2001 which expands the boundaries of Area A. Previously, the Area A boundaries followed the boundaries defined by S.B. 1427, which was passed by the Arizona Legislature in 1998. Specifically, H.B. 2538 expands the boundaries of Area A past those described in S.B. 1427 adding additional portions of Maricopa County west of Goodyear and Peoria and a small piece of land on the north side of Lake Pleasant. The implementation of air quality measures in the areas described in H.B. 2538 began on January 1, 2002, except for public sector alternative fuel requirements that are phased in over a seven year period.

“Area A” means the area delineated as follows:

- (a) In Maricopa County:
  - Township 8 North, Range 2 East and Range 3 East
  - Township 7 North, Range 2 West Through Range 5 East
  - Township 6 North, Range 5 West Through Range 6 East
  - Township 5 North, Range 5 West Through Range 7 East
  - Township 4 North, Range 5 West Through Range 8 East
  - Township 3 North, Range 5 West Through Range 8 East
  - Township 2 North, Range 5 West Through Range 8 East

Township 1 North, Range 5 West Through Range 7 East  
Township 1 South, Range 5 West Through Range 7 East  
Township 2 South, Range 5 West Through Range 7 East  
Township 3 South, Range 5 West Through Range 1 East  
Township 4 South, Range 5 West Through Range 1 East

(b) In Pinal County:

Township 1 North, Range 8 East And Range 9 East  
Township 1 South, Range 8 East And Range 9 East  
Township 2 South, Range 8 East And Range 9 East  
Township 3 South, Range 7 East Through Range 9 East

(c) In Yavapai County:

Township 7 North, Range 1 East And Range 1 West Through Range 2 West  
Township 6 North, Range 1 East And Range 1 West

It is important to note that under A.R.S. 49-406 (A), MAG has statutory authority to conduct nonattainment area planning within Maricopa County. However, MAG does not have air quality planning authority for either Pinal or Yavapai Counties.

Under A.R.S. 49-406 (K), the Arizona Department of Environmental Quality has air quality planning authority to adopt SIP measures in those portions of Area A in Pinal and Yavapai Counties where MAG does not have authority. For ozone, the committed measures include the Vehicle Emissions Inspection Program, Clean Burning Gasoline Program, Stage II Vapor Recovery Program, Trip Reduction Program, Voluntary Vehicle Repair and Retrofit Program, and Traffic Signal Synchronization. For carbon monoxide, the committed measures include the Vehicle Emissions Inspection Program, Clean Burning Gasoline Program, Trip Reduction Program, Clean Burning Fireplace Construction and Conversion Program, No Burn Days and Public Participation Programs, Voluntary Vehicle Repair and Retrofit Program. MAG anticipates that ADEQ will also provide notice and public hearing on this plan, perhaps jointly with MAG, prior to ADEQ's adoption of the plan under A.R.S. section 49-404 and ADEQ's subsequent submittal of the plan to EPA for approval. Upon EPA approval of the submitted plan, the contingency provisions will become an enforceable part of the Arizona SIP, which means that implementation of the specific measures included within "Expansion of Area A Boundaries" can be enforced by EPA or citizens under the Clean Air Act (once the triggering event occurs), including those specific measures that relate to actions to be taken outside of the nonattainment area. Emission reduction credit for this measure applies only to the area between the Area A boundary established by S.B. 1427 and the Area A boundary established by H.B. 2538.

The emissions reduction attributable to this contingency measure is 1.3 metric tons per day of VOC and 0.7 metric tons per day of NOx. This is equivalent to a reduction in emissions on June 6, 2002 of 0.2 percent for both VOC and NOx.

2. *Gross Polluter Option for I/M Program Waivers*

Arizona Legislature passed S.B. 1427 in 1998 which requires that in order to obtain a waiver from compliance with the Vehicle Emissions Inspection Program, the owner of a vehicle emitting more than twice the emission standard has to repair the vehicle sufficiently to reduce the emission levels to less than twice the standard (A.R.S. 49-542).

The emissions reduction attributable to this contingency measure is less than 0.1 metric tons per day of VOC and less than 0.1 metric tons per day of NOx. This is equivalent to a reduction in emissions on June 6, 2002 of less than 0.1 percent for both VOC and NOx.

3. *Increased Waiver Repair Limit Options*

Arizona Legislature passed S.B. 1427 in 1998 which increases the amount a person must spend to repair a failing 1967-1974 vehicle in Area A to qualify for a waiver. The increased amount is \$200 rather than the previous \$100 (A.R.S. 49-542).

The emissions reduction attributable to this contingency measure is less than 0.1 metric tons per day of VOC and less than 0.1 metric tons per day of NOx. This is equivalent to a reduction in emissions on June 6, 2002 of less than 0.1 percent for both VOC and NOx.

4. *Federal Heavy Duty Diesel Vehicle Emissions Standards*

In 2001 EPA issued a final rule setting more stringent emission standards for new heavy duty diesel vehicles (EPA, Federal Register, Vol. 66, No. 12, January 18, 2001, pp. 5001-5193). The rule requires that high-efficiency catalytic converters or comparably effective technologies be installed on 2007 and later model year diesel vehicles. Because these devices are damaged by sulfur, the rule also mandates that ultra-low sulfur (i.e., 15 ppm) diesel fuel be used in all onroad diesel vehicles beginning in 2006. The requirement for all onroad diesel vehicles to use ultra-low sulfur fuel went into effect nationwide on October 15, 2006.

The emissions reduction attributable to this contingency measure is less than 0.1 metric tons per day of VOC and 2.5 metric tons per day of NOx. This is equivalent to a reduction in emissions on June 6, 2002 of less than 0.1 percent of VOC and 0.8 percent of NOx.

5. *Federal Nonroad Equipment Emissions Standards*

In 1998 EPA issued a final rule setting more stringent Tier 2 and Tier 3 emission standards for new diesel nonroad equipment [EPA, 1998] The Tier 2 program phased in more stringent standards for all equipment between 2001 and 2006 and Tier 3

imposed even more stringent standards for 50 to 750 hp engines beginning in 2006 through 2008.

In 2004 EPA issued the Clean Air Nonroad Diesel - Tier 4 Final Rule that requires manufacturers to produce nonroad engines with advanced emission-control technologies that will reduce emissions by more than 90 percent [EPA, 2004]. The Tier 4 standards apply to nonroad engines less than 25 hp, beginning in 2008. The Tier 4 standards for larger engines will be phased in between 2011 and 2015, depending upon the size and type of engine.

The emissions reduction attributable to this contingency measure is 14.6 metric tons per day of VOC and 15.6 metric tons per day of NO<sub>x</sub>. This is equivalent to a reduction in emissions on June 6, 2002 of 2.1 percent of VOC and 6.1 percent of NO<sub>x</sub>.

#### MEASURES THAT IMPROVE AIR QUALITY, WHICH WERE NOT USED FOR NUMERIC CREDIT

There are some committed measures from the EPA approved Serious Area Carbon Monoxide Plan, Carbon Monoxide Redesignation Request and Maintenance Plan, and One-Hour Ozone Redesignation Request and Maintenance Plan which improve air quality that were not used for numeric credit in those approved plans. The reduction in carbon monoxide and ozone precursor emissions attributable to these measures was not easily quantified or may not have been possible to quantify. However, these committed measures may continue to reinforce the air quality benefits of the measures for which numeric credit towards attainment was taken.

#### THE NEXT CHAPTER

The next chapter discusses the emissions inventories and modeling that were applied to demonstrate that the Maricopa nonattainment area will attain the eight-hour ozone standard by June 15, 2009, as required by the Clean Air Act. The modeling for the attainment demonstration assumes emissions reduction credit for the seven attainment measures described earlier in this chapter.

## **CHAPTER FIVE**

### **ATTAINMENT DEMONSTRATION**

This chapter documents the 2008 attainment demonstration for the Maricopa eight-hour ozone nonattainment area. Photochemical grid modeling has been performed to determine if the Maricopa nonattainment area will meet the eight-hour ozone standard of 0.085 ppm by June 15, 2009. The modeling concludes that the nonattainment area will meet the eight-hour ozone standard with the existing federal, state, and local control measures.

The conclusion that the standard will be attained by June 15, 2009 is also supported by results of technical analyses, including an EPA-recommended screening test and a weight of the evidence analysis. A detailed description of the modeling and supplemental technical analyses is provided in the Technical Support Document.

To support the finding of attainment, this chapter discusses the attainment date, attainment measures, modeling emissions inventories, and modeled attainment demonstration. Other Clean Air Act requirements for an attainment demonstration, addressed at the end of this chapter, include the onroad mobile emissions budgets for conformity, contingency measures, and reasonable further progress.

#### **ATTAINMENT DATE**

Eight-hour ozone nonattainment areas, such as the Maricopa area, that are classified as Basic under Part D, Subpart 1, of the Clean Air Act, must attain the standard no later than five years from the date of designation. The designation of portions of Maricopa and Pinal Counties as an eight-hour ozone nonattainment area became effective on June 15, 2004, establishing an attainment date of June 15, 2009. To ensure that the standard is achieved by this date, EPA requires that control measures be implemented and attainment be modeled for the ozone season in the year that precedes the attainment date, in this case, 2008.

This plan demonstrates through photochemical grid modeling and other supporting technical analyses that attainment will be achieved during the ozone season of 2008 for three different episodes. These episodes represent meteorological regimes and emissions inventories that caused worst-case violations of the eight-hour ozone standard during the years 2000-2004. The process for selecting the episodes for the attainment demonstration is fully documented in the protocol for the eight-hour ozone modeling [MAG, 2005]. The three episodes selected for modeling were August 5-11, 2001, June 3-7, 2002, and July 8-14, 2002. Three “spin-up” days were added to the beginning of each episode, for a total of 25 days that were modeled.

The purpose of photochemical grid modeling is to demonstrate attainment of the eight-hour ozone standard with control measures that have been implemented before the ozone season of 2008. The simulations for August 2001, June 2002, and July 2002 and projections for these same episodes in 2008 were conducted using the Comprehensive Air quality Model with Extensions (CAMx).

The CAMx modeling was one of several technical approaches used to determine whether the Maricopa nonattainment area will attain the federal standard for eight-hour ozone with the committed attainment measures. A screening test and weight of evidence analysis were also conducted to bolster the findings of the modeled attainment demonstration. The screening test is described below; the weight of the evidence analysis is documented in Appendix V of the Technical Support Document.

The modeling conducted for the Plan demonstrates attainment for all three of the 2008 eight-hour ozone episodes. However, only the June 2002 episode performed satisfactorily in replicating monitored eight-hour ozone concentrations, based on EPA statistical criteria for model performance [EPA, 2005a]. CAMx simulations for the July 2002 and August 2001 consistently underestimated monitored ozone concentrations. Therefore, the results of the modeled attainment demonstration reported in this chapter represent the June 2008 episode. The modeling results for all three episodes are documented in Section V of the Technical Support Document.

The validation of the CAMx model for the June 2002 episode involved simulating eight-hour ozone concentrations on eight consecutive days: May 31 - June 7, 2002. The emissions inventories and modeling results discussed in this chapter represent the meteorological conditions and diurnal and spatial patterns of emissions on the day during the June 2002 episode that the highest eight-hour ozone concentration was measured, i.e., June 6, 2002. To ensure that the same meteorology and diurnal patterns that resulted in the highest ozone concentration are reflected in the attainment demonstration, the 2008 modeling results comparable to June 6, 2002 are labeled "a Thursday in June 2008." This distinction is necessary because June 6 falls on a Friday in 2008.

## ATTAINMENT MEASURES

The committed measures used to model attainment of the eight-hour ozone standard in 2008 are summarized in Table 5-1. The VOC and NOx emissions reduction credit attributable to these measures on a Thursday in June 2008 is quantified in Table 5-2. Credit for these attainment measures is assumed in the 2008 emissions inventories used in modeling attainment for all three high ozone episodes. The committed attainment measures are described in Chapter Four.

Relative to total base case anthropogenic emissions, the cumulative emission reductions due to all seven attainment measures in June 2008 are 2.4 percent for VOC and 4.6 percent for NOx. The methodologies for quantifying the emission reduction credit for the individual measures are described in Section V of the Technical Support Document.

Table 5-1      Attainment Measures Used for Numeric Credit

1.	Summer Fuel Reformulation: California Phase 2 and Federal Phase II Reformulated Gasoline with 7 psi from May 1 through September 30
2.	Phased-In Emission Test Cutpoints (I/M 147 Program)
3.	One Time Waiver from Vehicle Emissions Test
4.	Coordinate Traffic Signal Systems
5.	Develop Intelligent Transportation Systems
6.	Tougher Enforcement of Vehicle Registration and Emission Test Compliance
7.	Maricopa County Rule 358: Polystyrene Foam Operations



**Table 5-2  
2008 Emission Reductions by Individual Measure for the  
Eight-Hour Ozone Modeling Domain (4 km)**

	VOC		NOx	
Total Base Case Anthropogenic Emissions on a Thursday in June 2008 (metric tons/day)	254.3		291.8	
Attainment Measure	Emission Reductions (metric tons/day)	Percent Reduction in Emissions	Emission Reductions (metric tons/day)	Percent Reduction in Emissions
1. Summer Fuel Reformulation: California Phase 2 and Federal Phase II Reformulated Gasoline with 7 psi from May 1 through September 30	0.1 (Increase)	< 0.1% (increase)	10.3	3.5%
2. Phased-In Emission Test Cutpoints	3.1	1.2%	2.6	0.9%
3. One Time Waiver from Vehicle Emissions Test	0.1	< 0.1%	< 0.1	< 0.1%
4. Coordinate Traffic Signal Systems	< 0.1	< 0.1%	< 0.1	< 0.1%
5. Develop Intelligent Transportation Systems	2.2	0.9%	0.4	0.1%
6. Tougher Enforcement of Vehicle Registration and Emission Test Compliance	0.2	< 0.1%	0.1	< 0.1%
7. Rule 358: Polystyrene Foam Operations	0.5	0.2%	N/A	N/A
Total Emission Reductions due to Attainment Measures	6.0	2.4%	13.4	4.6%

## EMISSIONS INVENTORIES

The ozone precursor emissions for June 6, 2002 and the comparable emissions on a Thursday in June 2008 are summarized by source category in Table 5-3, for VOC and Table 5-4, for NO<sub>x</sub>. Pie charts showing the VOC emissions by source for the June episode day are illustrated in Figure 5-1 for 2002 and Figure 5-2 for 2008. Figures 5-3 and 5-4 show the NO<sub>x</sub> emissions for the same episode day in June 2002 and 2008, respectively. The methodologies and assumptions used in developing the base year and attainment year emissions inventories for the June, July, and August episodes are described in the Technical Support Document.

It is important to note that the anthropogenic VOC and NO<sub>x</sub> emissions for all three episodes were increased by three percent in 2008 to accommodate new population projections recently prepared by the Arizona Department of Economic Security (DES), based on the 2005 Special Census for Maricopa County. Although the new DES population control totals for Maricopa County became available in the Fall of 2006, MAG had not completed the land use modeling that allocates the control totals to small areas (e.g., one acre grids, traffic analysis zones, regional analysis zones) in time to be used in the modeling for this Plan. When the new projections are adopted by the MAG Regional Council (anticipated in late May 2007), the projected population, employment, and vehicle miles of travel are expected to be about 3 percent higher in 2008 than the projections used in the eight-hour ozone modeling for the attainment demonstration.

In addition, the NO<sub>x</sub> emissions for onroad mobile sources were increased by five percent in 2008 for all three episodes in order to create a safety margin for transportation conformity purposes. The rationale for this increase is discussed in the Onroad Mobile Emissions Budgets for Conformity section in this chapter.

The modeling for the 2008 attainment demonstration assumed both the three percent increase in VOC and NO<sub>x</sub> from anthropogenic sources and the five percent increase in NO<sub>x</sub> from onroad mobile sources. These increases were distributed spatially in proportion to the 2008 emissions for the appropriate source (i.e., anthropogenic, onroad mobile sources) in each 4 km grid cell.

In addition, Transwestern Pipeline Company is proposing a Phoenix Expansion Project to construct pipeline and ancillary facilities to provide capacity for the transport of natural gas to delivery points in the Phoenix area. Transwestern has indicated that the construction emissions of nitrogen oxides for the Phoenix Expansion Project exceeded the General Conformity de minimis values in filings made to the Federal Energy Regulatory Commission [Osborne, 2007].

Jon Pollack of TRC Solutions provided the emission estimates of 0.09 tons per day of VOC and 1.35 tons per day of NO<sub>x</sub> for the Phoenix Expansion Project [Pollack, 2006]. Mr. Pollack indicated that the source of the ozone precursor emissions for the Phoenix Expansion Project is construction-related and that the construction of the project will

Table 5-3 VOC Emissions in the Ozone Modeling Domain for June 2002 and 2008

Source Category	June 6, 2002	Thursday in June 2008	2008-2002 Difference
	Metric Tons per Day	Metric Tons per Day	%
Point	11.72	13.55*	15.6
Area	90.56	105.04*	14.5
Nonroad Mobile	50.73	57.55*	13.4
Onroad Mobile	91.84	72.34*	-21.2
Biogenics	451.28	451.28	0.0
Total	696.13	699.76*	0.5

\*Includes a 3 percent (i.e., 7 metric ton) increase in anthropogenic VOC emissions to accommodate new population and employment projections for 2008 based on the 2005 Census for Maricopa County.

Figure 5-1 VOC Emissions for June 6, 2002

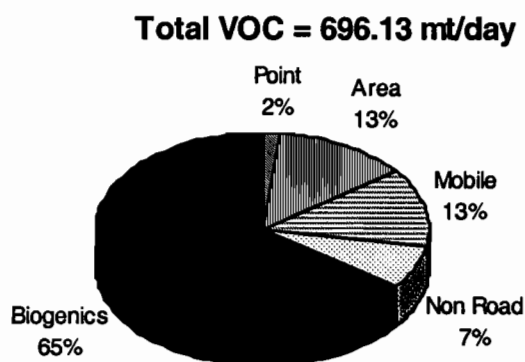


Figure 5-2 VOC Emissions for a Thursday in June 2008

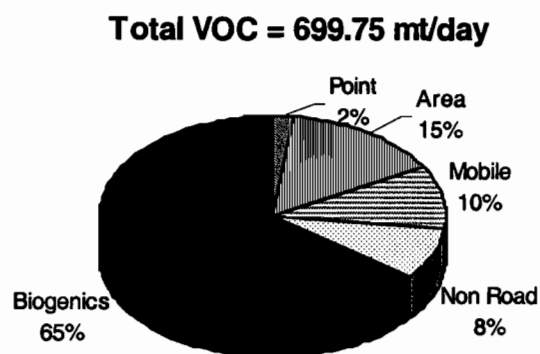


Table 5-4 NOx Emissions in the Ozone Modeling Domain for June 2002 and 2008

Source Category	June 6, 2002	Thursday in June 2008	2008-2002 Difference
	Metric Tons per Day	Metric Tons per Day	%
Point	11.15	32.78*	194.0
Area	9.79	13.49*	37.8
Nonroad Mobile	79.97	86.58*	8.3
Onroad Mobile	182.36	145.52*	-20.2
Biogenics	8.56	8.56	0.0
Total	291.82	286.93*	-1.7

\*Includes a 3 percent (i.e., 8 metric ton) increase in anthropogenic NOx emissions to accommodate new population and employment projections for 2008 based on the 2005 Census for Maricopa County and a 5 percent increase in onroad mobile emissions to create a safety margin for the NOx conformity budget.

Figure 5-3 NOx Emissions for June 6, 2002

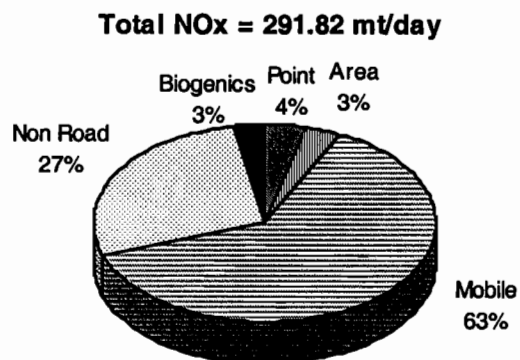
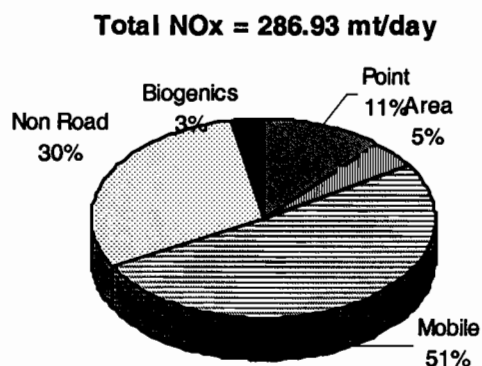


Figure 5-4 NOx Emissions for a Thursday in June 2008



commence and be completed during the calendar year of 2008. Mr. Pollack requested that the nonroad construction equipment emissions associated with this project be added to the emissions inventories for the 2008 attainment demonstration.

To accommodate this request, MAG added the nonroad construction-related emissions for the Phoenix Expansion Project to the NO<sub>x</sub> and VOC emissions for every day of the week, except Sunday, in the modeled June, July and August 2008 episodes. The emissions from the project are included in the area source category for the Thursday in 2008 shown in Tables 5-3 and 5-4.

For purposes of photochemical grid modeling, the emissions for the Phoenix Expansion Project were apportioned equally across the 4 kilometer by 4 kilometer grid cells in the ozone modeling domain that contains the proposed alignment for the pipeline. As discussed in the next section, the modeling for the Eight-Hour Ozone Plan, including the additional NO<sub>x</sub> and VOC emissions from construction of the Phoenix Expansion Project, demonstrates attainment of the eight-hour ozone standard for all three episodes during the ozone season of 2008.

#### ATTAINMENT DEMONSTRATION

To demonstrate attainment of the national ambient air quality standard, modeled eight-hour ozone concentrations in 2008 should be less than 0.085 ppm for all modeled episode days. The attainment demonstration followed the modeling procedures described in EPA guidance [EPA, 2005a].

The process for selecting the models, modeling domains, and episodes for the attainment demonstration is fully described in the protocol for the eight-hour ozone modeling [MAG, 2005]. A detailed discussion of the models that were applied, as well as model inputs, validation, and projections, is provided in the Technical Support Document.

The Comprehensive Air quality Model with Extensions (CAMx) is the photochemical grid model that was selected and applied to model attainment of the eight-hour ozone standard in 2008. Validation of the CAMx model was performed for the August 2001, June 2002, and July 2002 eight-hour ozone episodes. Based on EPA statistical criteria for model performance, the CAMx model satisfactorily replicated actual eight-hour ozone concentrations on all days during the June 2002 episode, except June 3. For the July 2002 and August 2001 episodes, CAMx consistently underestimated monitored ozone concentrations. The results of the CAMx validations for all three episodes are presented in the Technical Support Document.

The CAMx modeling demonstrates attainment in 2008 for the June, July, and August ozone episodes. Since the June 2002 episode provided the best model validation from a statistical perspective, the results of the CAMx simulations for June 2008 are reported in this section. The detailed modeling results for the July and August 2008 episodes are contained in the Technical Support Document.

For each episode, a relative reduction factor (RRF) was calculated for ozone monitoring sites in accordance with the guidance provided by EPA [EPA, 2005a]. The RRF is the ratio of the 2008 CAMx-modeled eight-hour ozone concentration to the base year (i.e., 2001 or 2002) CAMx-modeled concentration at each monitoring location. The RRF is applied to the base year design value to predict the future year design value. An isopleth plot of the relative reduction factors for the June episode is shown in Figure 5-5.

The RRFs and the predicted eight-hour ozone design values for each monitoring site in June 2008 are shown in Table 5-5. An isopleth plot of the predicted eight-hour ozone design values for the June 2008 episode is shown in Figure 5-6.

The highest future design value in the June 2008 modeled episode is 0.0848 ppm at the Humboldt Mountain monitor. The highest future design value in July 2008 is 0.0836 ppm at the North Phoenix monitor. The highest future design value in August 2008 is 0.0848 ppm at the Blue Point monitor. EPA guidance specifies that the modeled future design values should be truncated to the thousandth of a ppm [EPA, 2005a]. This means that the peak future design values are 0.084 ppm in June and August 2008 and 0.083 ppm in July 2008.

Since these peak future design values for all three episodes are less than the eight-hour ozone standard, the modeling concludes that the eight-hour ozone standard will be met in the Maricopa nonattainment area during the ozone season of 2008 with the control measures that are in place by the beginning of that season. However, the modeling protocol [MAG, 2005] for the Eight-Hour Ozone Plan indicated that additional analyses would be performed if the design values predicted by the CAMx model exceeded 80 ppb. Since many of the future design values exceed 80 ppb, additional technical analyses were conducted to corroborate the modeling results. One of these analyses was a screening test recommended by EPA [EPA, 2005a].

The screening test is designed to ensure that ozone will not exceed the standard in locations that are not near (i.e., in the 7 x 7 grid array surrounding) a monitor. In general, this test is performed for the identified areas in the nonattainment area where predicted eight-hour daily maximum ozone concentrations are “consistently greater” than any predicted in the vicinity of a monitoring site. To be conservative, the screening test was performed for the entire 4 km ozone modeling domain (i.e., 50 x 29 cells; 1450 cells). A 7 x 7 array of grid cells was constructed around each cell in the 4 km domain. For each cell, the design value was estimated by multiplying the modeled RRF by the current design value of each cell, that had been estimated using spatial interpolation. The screening test concluded that the estimated values are less than or equal to 84 ppb in all grid cells in the nonattainment area for each modeling episode. So the screening test is passed.

Figure 5-5. Isopleth Plot of the Modeled RRFs for the June Episode

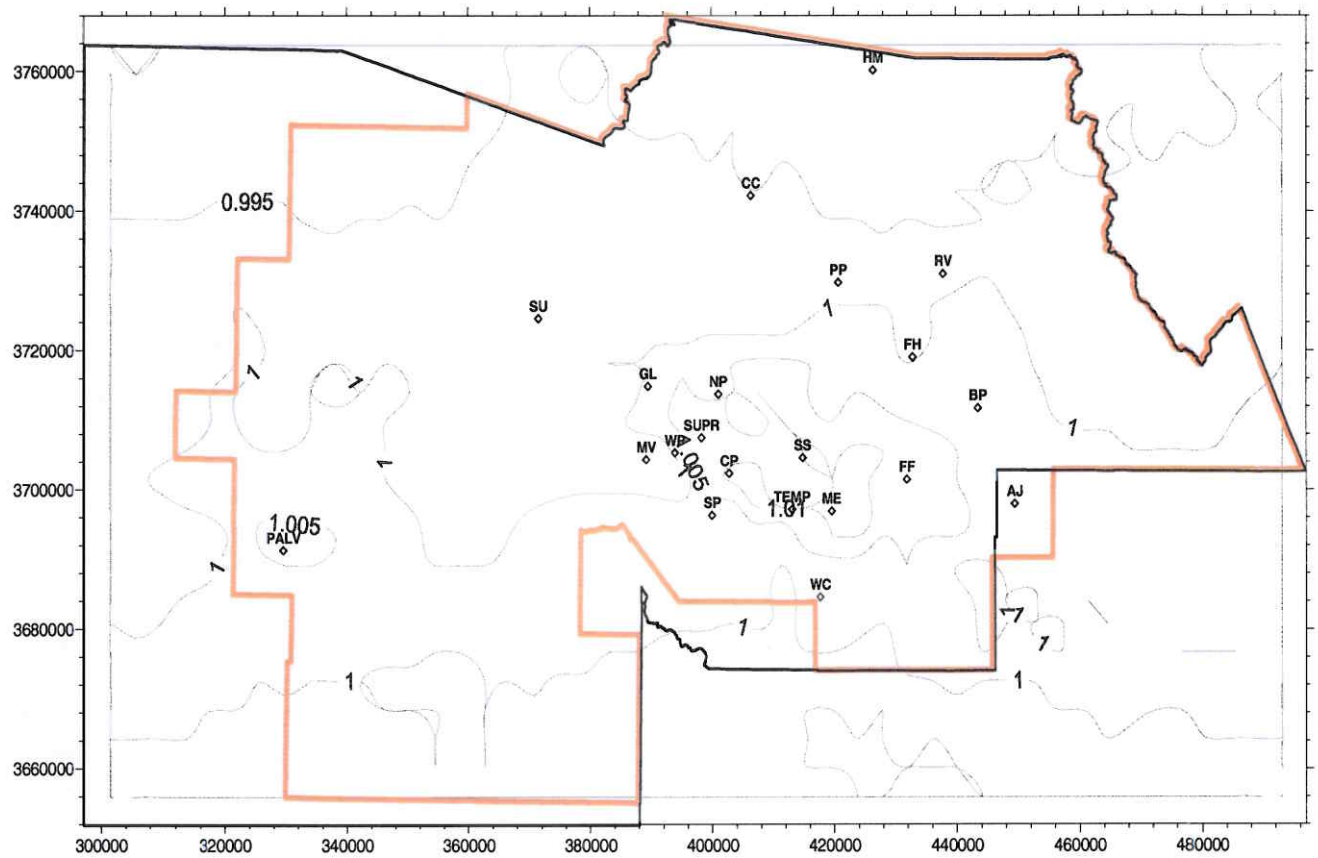
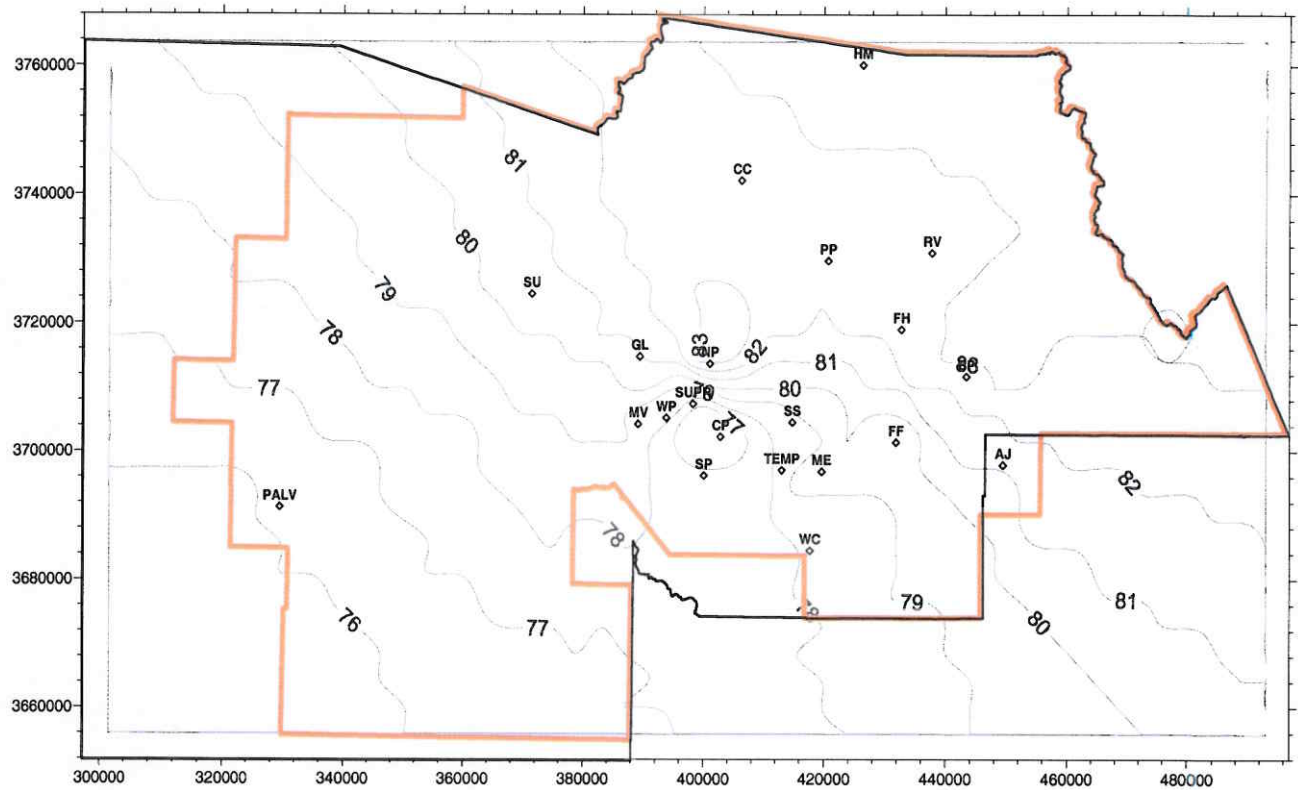




Table 5-5 Site-Specific Eight-Hour Ozone Design Values for the June 2008 Episode

Monitoring Site	Calculated baseline design value, (DVB) <sub>1</sub> , (ppb)	Baseline 8-hr daily max. concentration at monitor (ppb)	Future predicted 8-hr daily max. concentration at monitor (ppb)	Relative reduction factor (RRF)	Future design value, (DVF) <sub>1</sub> , (ppb)
Blue Point	83.3	88.8	88.9	1.001	83.4 = 83 ppb
Cave Creek	82.5	89.7	89.2	0.994	82 = 82 ppb
Central Phoenix	75.7	84.7	85.8	1.013	76.7 = 76 ppb
Falcon Field	79.3	87.5	88.2	1.008	79.9 = 79 ppb
Fountain Hills	83	88.9	88.9	1	83 = 83 ppb
Glendale	81	84.5	84.9	1.005	81.4 = 81 ppb
Humboldt Mountain	85.7	87.4	86.5	0.99	84.8 = 84 ppb
Maryvale	79.5	85.2	85	0.998	79.3 = 79 ppb
North Phoenix	84.3	85.2	85.6	1.005	84.7 = 84 ppb
Palo Verde	75.7	87.5	87.9	1.005	76.1 = 76 ppb
Pinnacle Peak	82.3	89.3	88.9	0.996	82 = 82 ppb
Rio Verde	82.3	88.9	88.7	0.998	82.1 = 82 ppb
South Phoenix	77.7	83.8	84.2	1.005	78.1 = 78 ppb
Super Site	78.3	86.1	87.2	1.013	79.3 = 79 ppb
Surprise	75.7	84.7	85.6	1.011	76.5 = 76 ppb
Tempe	78.3	84.9	85.9	1.012	79.2 = 79 ppb
West Chandler	78.3	83.1	83.4	1.004	78.6 = 78 ppb
West Phoenix	78.3	84.4	84.9	1.006	78.8 = 78 ppb

Figure 5-6. Isopleth Plot of the Future Design Values for the June 2008 Episode  
(Max = 84 ppb)



In addition to the screening test, a comprehensive weight of evidence analysis was conducted that supports the modeling conclusion that the eight-hour ozone standard will be attained by June 15, 2009 [ENVIRON, 2007]. This corroboratory information is presented in Appendix V of the Technical Support Document. The weight of evidence analysis concludes that ozone precursor emissions and concentrations in the Maricopa nonattainment area are trending downward and that the federal standard for eight-hour ozone will be attained by June 15, 2009.

#### ONROAD MOBILE EMISSIONS BUDGETS FOR CONFORMITY

In accordance with the 1990 Clean Air Act Amendments, transportation conformity requirements are intended to ensure that transportation activities do not result in air quality degradation. Section 176 of the Amendments requires that transportation plans, programs, and projects conform to applicable air quality plans before the transportation action is approved by a Metropolitan Planning Organization (MPO). The designated MPO for Maricopa County is the Maricopa Association of Governments.

Section 176(c) of CAAA provides the framework for ensuring that Federal actions conform to air quality plans under section 110. Conformity to an implementation plan means that proposed activities must not (1) cause or contribute to any new violation of any standard in any area, (2) increase the frequency or severity of any existing violation of any standard in any area, or (3) delay timely attainment of any standard or any required interim emission reductions or other milestones in any area.

EPA transportation conformity regulations establish criteria involving comparison of projected transportation plan emissions with the motor vehicle emissions assumed in applicable air quality plans. The regulations define the term “motor vehicle emissions budget” as meaning “the portion of the total allowable emissions defined in a revision of the applicable implementation plan (or in an implementation plan revision which was endorsed by the Governor or his or her designee) for a certain date for the purpose of meeting reasonable further progress milestones or attainment demonstrations, for any criteria pollutant or its precursors, allocated by the applicable implementation plan to highway and transit vehicles.”

EPA approved the One-Hour Ozone Maintenance Plan for the Maricopa Area on June 14, 2005. The Maintenance Plan contained 2006 and 2015 transportation conformity budgets for VOC and NO<sub>x</sub> for the one-hour ozone nonattainment area. On June 15, 2005, EPA revoked the one-hour ozone standard.

The EPA transportation conformity guidance for eight-hour ozone (EPA, 2004) indicates that the appropriate interim emissions tests for the Maricopa eight-hour ozone nonattainment area, which is larger than the former one-hour ozone nonattainment area, are: a budget test, based on the approved one-hour ozone budgets, and a no-greater-than-2002 baseline emissions. For the eight-hour ozone interim budget test, the one-hour ozone budgets have been adjusted to remove local travel in the Gila River Indian

Community. This adjustment is done, because the Maricopa County portion of the Gila River Indian Community was previously in the one-hour ozone nonattainment area, but was excluded from the eight-hour ozone nonattainment area by EPA [EPA 2004b].

The interim budget and no-greater-than-2002 emissions tests for eight-hour ozone were applied in the transportation conformity analyses conducted in 2005 and 2006 and will continue to be used until eight-hour ozone budgets are found to be adequate or approved in a SIP by EPA. This Eight-Hour Ozone Plan establishes conformity budgets based on 2008 onroad mobile source VOC and NO<sub>x</sub> emissions in the eight-hour ozone nonattainment area.

The conformity budget is represented by the onroad mobile source VOC and NO<sub>x</sub> emissions for the peak episode day in June 2008 that was used to model attainment of the eight-hour ozone standard, as discussed in the previous section. As shown in Tables 5-3 and 5-4, the onroad mobile source emissions in the eight-hour ozone modeling domain on a Thursday in June 2008 are 72.3 metric tons per day for VOC and 145.5 metric tons per day for NO<sub>x</sub>.

GIS was applied to extract the portion of the onroad mobile emissions in the eight-hour ozone nonattainment area from the larger modeling domain. The resultant onroad mobile emissions for the nonattainment area are 67.9 metric tons per day for VOC and 138.2 metric tons per day for NO<sub>x</sub>. These represent the 2008 eight-hour emissions budgets for use in transportation conformity.

MAG will replace the interim eight-hour ozone emissions tests with the new VOC and NO<sub>x</sub> emissions budgets for use in the conformity analysis that begins after the budgets are found to be adequate or approved by EPA as part of the Eight-Hour Ozone Attainment Plan. In subsequent conformity analyses, onroad mobile source emissions for conformity horizon years can not exceed these 2008 budgets.

The methodology used to estimate onroad mobile source emissions for 2008 is documented in Section V-3 of the Technical Support Document. The models and assumptions used in estimating onroad mobile source emissions for future conformity analyses may differ from those described in the Technical Support Document, because the latest planning assumptions (e.g., new emissions models, vehicle registrations, speeds, population and travel projections) must be used each time a conformity analysis is performed. [FHWA, 2001].

Due to the inherent uncertainties associated with the requirement to use latest planning assumptions in conformity analyses, the onroad mobile NO<sub>x</sub> emissions used in modeling attainment were increased by five percent to create a safety margin for the NO<sub>x</sub> conformity budget. EPA has indicated that safety margins are allowed, if attainment can be modeled with the increased emissions [EPA, 2004a; EPA, 2007]. The onroad mobile source NO<sub>x</sub> emissions used in modeling attainment of the eight-hour ozone standard for all three episodes were increased by five percent. The increase was distributed spatially in the

ozone modeling domain based on the proportion of onroad mobile emissions assigned to each 4 km grid cell. The five percent increase is reflected in the onroad mobile source NO<sub>x</sub> emissions in Table 5-4, as well as the NO<sub>x</sub> conformity budget of 138.2 metric tons per day.

### CONTINGENCY MEASURES

Section 172(c)(9) of the Clean Air Act requires that nonattainment plans contain contingency measures. Such measures are to be undertaken without further action by the State or the EPA Administrator if the area fails to make reasonable further progress or meet the standard by the attainment date. Committed measures that have already been implemented may be contingency measures if they are not needed to show attainment and do not hasten attainment. [EPA, 1993]. EPA also allows federal measures to be contingency measures if they are not needed for attainment [EPA, 2005b].

The five contingency measures in the Eight-Hour Ozone Plan are: Area A Expansion (H.B. 2538); Gross Polluter Option for I/M Program Waivers; Increased Waiver Repair Limit Options; Federal Heavy Duty Diesel Vehicle Emission Standards, and Federal Nonroad Equipment Emission Standards. Emission reduction credit for these contingency measures was not taken in modeling attainment of the eight-hour ozone standard in 2008.

A description of the individual contingency measures is provided in Chapter Four. Early implementation of the local contingency measures and the phased implementation of the federal measures provides additional confidence that the eight-hour ozone standard will be attained in 2008 and beyond.

Table 5-6 quantifies the emission reduction credit attributable to each of the contingency measures, relative to the base case emissions on June 6, 2002. The methodologies for quantifying the emission reduction credit for the contingency measures are described in Section V-2-2 of the Technical Support Document.

Although there is no mandated emissions reduction level for contingency measures, EPA recommends that contingency measures provide a minimum reduction of three percent, relative to the base year, in VOC and NO<sub>x</sub> emissions, with at least a 0.3 percent reduction in VOC [EPA, 1993]. As indicated in Table 5-6, the reductions attributable to the contingency measures are 15.9 metric tons per day of VOC and 18.8 metric tons per day of NO<sub>x</sub>. These represent a 2.2 percent reduction in VOC emissions and a 6.4 percent reduction in NO<sub>x</sub> emissions, relative to base case emissions on June 6, 2002.

The combined VOC and NO<sub>x</sub> reductions of 8.7 percent surpasses the EPA-recommended three percent. In addition, the 2.3 percent reduction in VOC emissions greatly exceeds the EPA-recommended value of 0.3 percent. Therefore, the EPA guidelines for emission reductions from contingency measures are satisfied.

Table 5-6 Emission Reductions by Individual Contingency Measure in the Eight-Hour Ozone Modeling Domain

	VOC		NOx	
	Emission Reductions (metric tons/day)	Percent Reduction in Emissions	Emission Reductions (metric tons/day)	Percent Reduction in Emissions
Base Case Emissions on June 6, 2002 (metric tons/day)	696.13		291.82	
<b>Contingency Measure</b>				
1. Expansion of Area A Boundaries (H.B. 2538)	1.3	0.2%	0.7	0.2%
2. Gross Polluter Option for I/M Program Waivers	<0.1	<0.1%	<0.1	<0.1%
3. Increased Waiver Repair Limit Options	<0.1	<0.1%	<0.1	<0.1%
4. Federal Heavy Duty Diesel Vehicle Standards	<0.1	<0.1%	2.5	0.9%
5. Federal Nonroad Equipment Standards	14.6	2.1%	15.6	5.3%
Total Emission Reductions due to Contingency Measures	15.9	2.3%	18.8	6.4%

The modeled attainment demonstration discussed earlier in this chapter did not assume emission reduction credit for the contingency measures. Supplemental analyses have indicated that the contingency measures would not reduce the peak modeled ozone concentrations in June, July, or August 2008. Therefore, inclusion of these contingency measures in the modeling for the attainment demonstration would not hasten attainment, (i.e., advance the attainment date from 2008 to 2007).

The success of an air quality program is measured by the concentrations recorded at the monitors. A violation of the eight-hour ozone standard occurs when the three-year average of the fourth highest annual value at a monitor is 0.085 ppm or greater. Ambient air quality monitoring data will be examined to determine if a violation has occurred. If the standard is violated at any monitor, additional contingency measures will be considered, which may include new measures or the strengthening of existing measures. If a violation occurs, additional contingency measures would be considered on the following schedule: (A) verification of the monitoring data to be completed three months after the violation occurs; (B) applicable contingency measure(s) to be considered for adoption six months after the date established in (A) above, and (C) contingency measure(s) to be implemented within six to twelve months after adoption, depending upon the time needed to put the measure in place.

#### REASONABLE FURTHER PROGRESS

Part D of the Clean Air Act, Section 171, indicates that “the term Reasonable Further Progress” means “such annual incremental reductions in emissions of the relevant air pollutant as are required by this part or may be reasonably required by the Administrator for the purpose of ensuring attainment of the applicable national ambient air quality standard by the applicable date.” The EPA Final Rule implementing the eight-hour ozone standard [EPA. 2005c] states that reasonable further progress (RFP) for areas, such as the Maricopa nonattainment area, that are classified under Part D, Subpart 1, with an attainment date within five years of designation (i.e., June 15, 2009 or sooner), would be met “by ensuring emissions reductions needed for attainment are implemented, ..., by the beginning of the ozone season prior to the attainment date.” The table on page 71632 of the same rule indicates that Subpart 1 areas with attainment dates within 5 years of designation would “meet RFP through showing of expeditious attainment.”

This EPA guidance indicates that this plan can demonstrate reasonable further progress by showing that (1) the emissions reductions needed for attainment are implemented by the beginning of the ozone season prior to attainment and (2) attainment of the eight-hour ozone standard is achieved expeditiously with these measures. The Attainment Demonstration section of this chapter indicates, through photochemical grid modeling supplemented by other technical analyses, that the eight-hour standard will be attained in June, July, and August 2008 with the adopted measures described in Chapter Four. All of the adopted measures are already implemented. Therefore, the EPA requirement for the measures to be in place prior to the ozone season of 2008 is met.



The requirement to achieve the eight-hour standard expeditiously with the measures in Chapter Four has also been met, as evidenced by the fact that there have been two consecutive years (i.e., 2005 and 2006) of “clean data” at all eight-hour ozone monitors in the Maricopa nonattainment area. Early implementation of the measures in Chapter Four has resulted in early implementation of the eight-hour ozone standard (i.e., before 2009), which clearly qualifies as expeditious attainment.

Since the measures needed for attainment have already been implemented and the standard has been met expeditiously, reasonable further progress has been demonstrated. The contingency measures and other measures that have not been quantified for the attainment demonstration will provide additional benefit in meeting the standard in 2008 and beyond.

## CONCLUSIONS

As discussed in this chapter, the CAMx modeling demonstrates attainment of the eight-hour ozone standard for three multi-day high ozone episodes representing differing meteorological and emissions regimes. The modeling indicates that eight-hour ozone concentrations throughout the Maricopa nonattainment area (MNA) will be less than 0.085 ppm for all three episodes during the ozone season of 2008.

The peak modeled ozone concentration of 0.0848 ppm occurs at the Humboldt Mountain monitor during June 2008. The peak modeled concentration during the July 2008 episode is 0.0836 ppm at the North Phoenix monitor. The peak modeled concentration of 0.0848 ppm occurs at the Blue Point monitor in August 2008. EPA guidance for eight-hour ozone modeling [EPA, 2005a] indicates that the modeled design values should be expressed in terms of three significant digits, with less significant digits truncated. Therefore, the peak concentrations in the June and August episodes are 0.084 ppm, the peak value for the July episode is 0.083 ppm, and all three episodes demonstrate attainment of the standard in 2008.

While the modeled values are only slightly below the standard, a screening test and weight of evidence analysis also support the results of the modeled attainment demonstration. The latter concludes that “eight hour ozone air quality in the MNA is improving as a result of existing control measures. Despite a continuous increase in the population in Maricopa and Pinal counties...and increases in other factors such as vehicle miles traveled..., the MNA is exhibiting decreasing trends for ozone and its precursors, NO<sub>x</sub> and VOC.” (Page 1, Appendix V of the TSD.)

Excerpts from the summary section of the weight of evidence analysis prepared by ENVIRON International Corporation are shown in italics below (Pages 26-27, Appendix V of the TSD).

*The weight of evidence analyses support the numerical modeling demonstration that the MNA will attain the 8-hour ozone standard by the attainment year of 2009 with current emission reduction programs and existing assumptions for population growth and economic development. The weight of evidence analyses considered...ambient ozone and NOx concentration trends, precursor emission trends, and ozone sensitivity to changes in NOx vs. VOC.*

The weight of evidence analysis also concludes that:

- *The MNA is exhibiting downward trends in ozone using several metrics, namely the number of annual violations of the 8-hour standard, the basinwide 8-hour ozone Design Value, and the basinwide annual 4<sup>th</sup> highest 8-hour ozone concentration;*
- *The largest ozone reductions have occurred for urban sites;*
- *The MNA is exhibiting large reductions in ozone precursor (NOx and VOC) emissions;*
  - *Historically, mobile-source controls have more than offset VMT growth in the region and have contributed to reductions in ozone precursor concentrations;*
  - *VMT is projected to grow by 84% in the next 20 years but increasingly stringent federal emission standards for vehicles and fuels will lead to VOC and NOx emissions reductions that are about double the needed offsets to maintain the ozone standard;*
- *Comparison of modeled and measured VOC composition (i.e., PAMS measurements) shows that the model is accurately reproducing VOC composition in central Phoenix. This finding build confidence in the ability of the photochemical model to characterize ozone photochemistry in Phoenix.*

In addition, the fact that the nonattainment area has not violated the eight-hour ozone standard in the past two years lends additional credence to the conclusions of the modeled attainment demonstration, screening test ,and weight of evidence analysis. It is important to reiterate that the measures that have enabled the nonattainment area to achieve “clean data” at the monitors in 2005 and 2006 are ongoing federal and legally-enforceable local commitments that should continue to improve ozone air quality in 2008 and beyond.

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